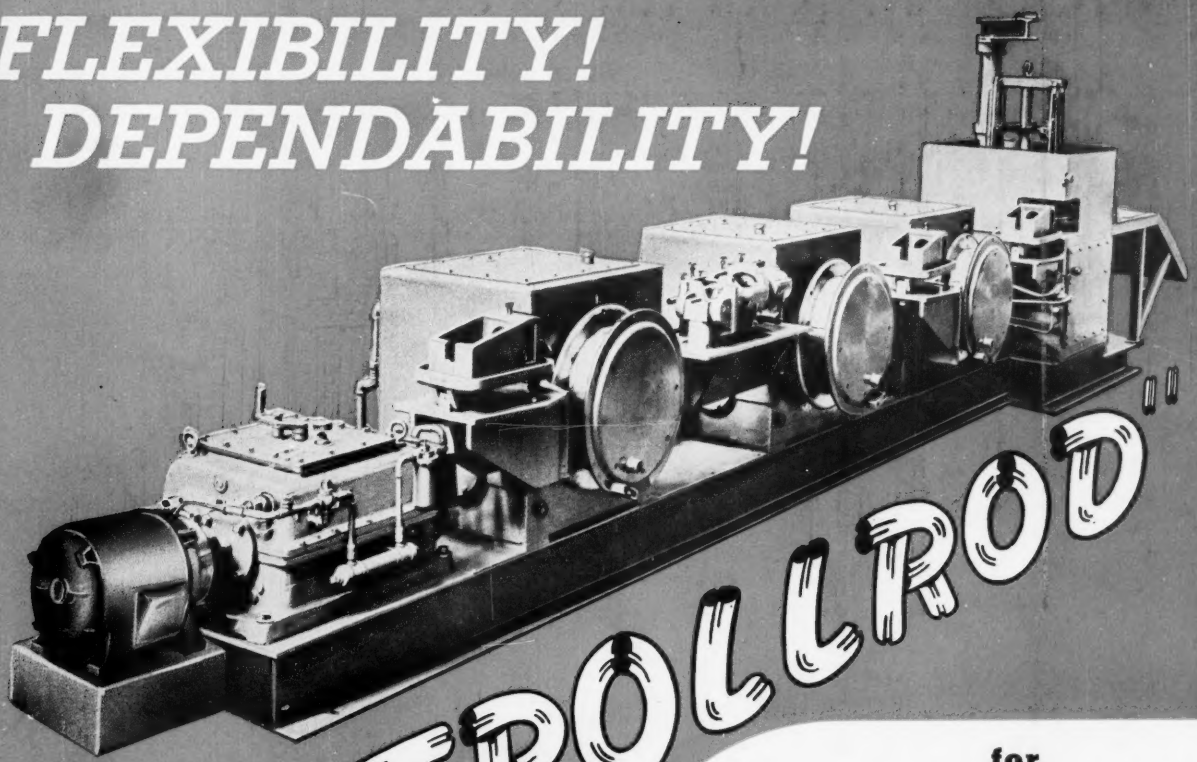
WIRE AND WIRE PRODUCTS

FEBRUARY 1948

VERSATILITY!
FLEXIBILITY!
DEPENDABILITY!



"TROLLROD"

SYNCRO

for

HEAVY-DUTY ROD DRAWING
of all non-ferrous Round
or Shaped PRODUCTS

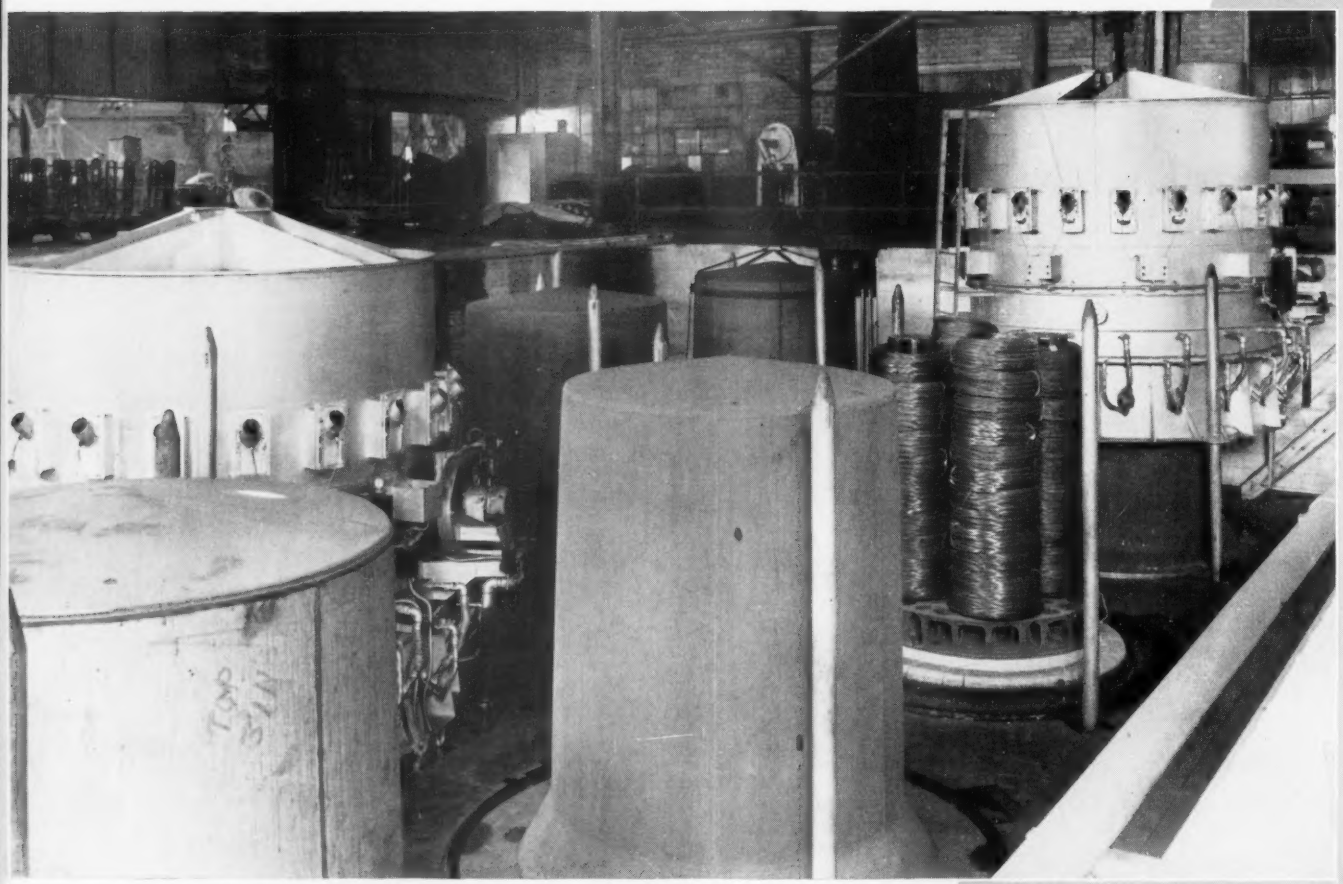
SYNCRO MACHINE COMPANY
611 Sayre Avenue Perth Amboy, N. J.
Affiliated Company
WINGET-SYNCRO, ROCHESTER, KENT, ENGLAND

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

To produce the ultimate in wire annealing

the Portsmouth Steel Corporation selected these

WILSON ANNEALING FURNACES



Charge size — 74" dia. x 84" high — 2 Furnaces, 8 Bases

Lee Wilson

ENGINEERED AND CONSTRUCTED BY THE

ENGINEERING CO., INC.

20005 West Lake Road • CLEVELAND, OHIO

Telephone ACademy 4670

INDUSTRIAL FURNACES ★ RADIANT TUBE HEATING ★ HEAT TREATING PROCESSES

Not for die-room "swamis"

This free course of training in wire-die application and maintenance methods is not for "crystal gazers."

It's for your experienced, seasoned veterans of the wire-die craft who feel in need of a practical "refresher" . . .

And for your young men new to the field.

Both will benefit from the valuable training at Carboloy's Die Training School in Detroit. It's completely up-to-date and down-to-earth . . . the kind of practical material that will help raise the efficiency of your die-room.

This training of your die-room personnel is the second phase of the four-point "Complete Package" Die Service that Carboloy offers all its customers . . . *without charge.*

The Carboloy four-point "Complete Package" Die Service:

1—Service centers and field engineers to help you

2—Free training for your die-room personnel

3—Recommendation for most efficient die-room equipment and operation

4—Local stocks to supply you quickly

You get all four when you specify Carboloy Cemented Carbide dies—and they're yours at no extra cost!

Most "old timers" already know

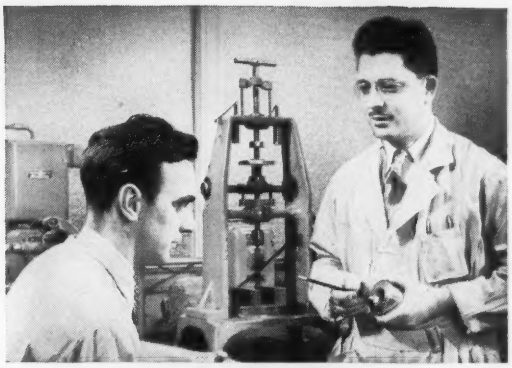
While the four special services described in this ad will help you raise your die-room efficiency, the *greatest* service Carboloy offers its customers is in *the outstanding quality and the wide range of drawing products it manufactures.*

Carboloy has a line of wire, bar and tube drawing dies and products that's just as complete as its package services to its customers.

Write us for full information on the four Carboloy special services and the wide range of Carboloy drawing products, which make up the Carboloy "Complete Package" Die Service.

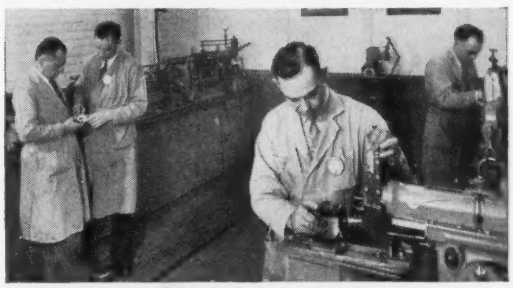
And while you're at it, ask for the 64-page "DIE SERVICE MANUAL," D-119. It's the best of its kind in the field. *Carboloy Company, Inc., E. 8 Mile, Detroit 32, Michigan.*

Specify CARBOLOY® CEMENTED CARBIDE For "Complete Package" Die Service



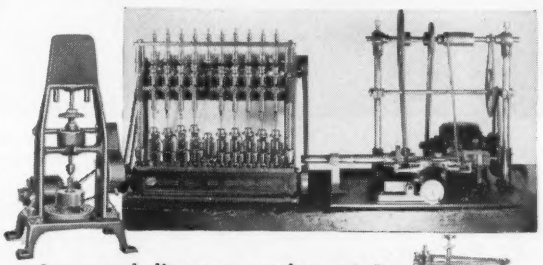
Service centers and field engineers

Help with die servicing and finishing problems: well equipped *die service centers* in Detroit, Chicago, Pittsburgh . . . experienced, capable *field engineers* in important wire drawing areas.



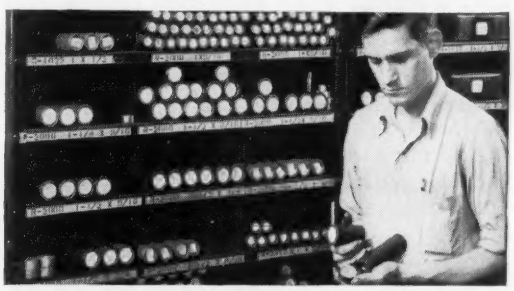
Free training for your personnel

Free instruction in carbide die application and maintenance methods for your die-room personnel . . . sure to benefit both veteran worker and "new man" and to *raise die-room efficiency.*



Approved die-room equipment

Recommendations for most efficient die-room equipment and operation. Die finishing and servicing equipment made or recommended by Carboloy means *faster, better die finishing.*



Local stocks of standards—fast deliveries

Complete *stocks of most commonly used standards* kept in metal working areas from coast to coast: Detroit, Los Angeles, Chicago, Pittsburgh, Newark. Speedy delivery to meet tight schedules.

Sure makes a difference when you use bethanized!

Because of its great ductility and its resistance to corrosion, bethanized wire is often chosen for difficult fabricating jobs, such as this spiral-weave conveyor belt.

Wire fabricators notice the difference immediately when they use bethanized wire for difficult forming jobs. For bethanized wire can really take it . . . it's zinc-coated wire that you can count on to stand up under severe fabrication.

Bethanized wire takes difficult forming so well because of the tightness and ductility of the bethanized coating. The coating, of 99.9 per cent pure zinc, is applied by an electrolytic process. Result: A coating that's pure zinc all the way through to the steel . . . a coating that's uniform, not only around but along the wire . . . a coating that's so tightly bonded to the base wire that both metals—zinc and steel—may be considered as practically one.

And the bethanized coating is so ductile that it can take any fabrication the wire itself can stand, bar none. Bending . . . twisting . . . drawing to fine gauge . . . all are accomplished with bethanized wire without any harm to the coating.

Corrosion resistant? Bethanized wire has excellent resistance to corrosion because there are no thin spots in the coating where rust might make an early start. But whenever corrosive conditions call for extra protection, bethanized coatings can be increased to three times the weight of those used in conventional Type 3 galvanizing.

If you'd like to find out more about bethanized wire, get in touch with the nearest Bethlehem district office, or write us at Bethlehem, Pa., for further details.

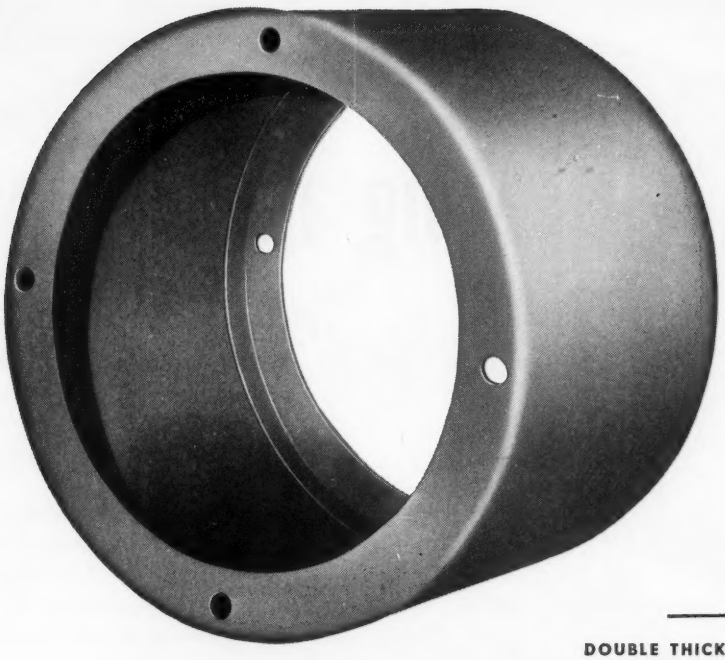
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export distributor: Bethlehem Steel Export Corporation, New York

★ Bethanized Wire ★

BETHLEHEM STEEL

WIRE & WIRE PRODUCTS, Vol. 23, No. 2, February, 1948. Publication Office, at 61 Cliff St., New York 7, N. Y. Executive Office, 300 Main Street, Stamford, Conn. Published monthly by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Secy. and Treas. Subscription price: U. S., $5.00; Canada, $5.00 per year; 50 cents per copy; Foreign, $7.50 per year. Entered as second class matter, June 14, 1946, at the Post Office, New York, N. Y., under Act of March 3, 1879.



DOUBLE THICKNESS
FLANGE AND
SHOULDER

NEW

the HUBBARD DST

DOUBLE-STRENGTH

steel traverse

Here is greater rigidity to maintain shape, lighter weight to reduce shipping expense to a minimum, and low original cost. The new Hubbard DST (double-strength) steel traverse gives you all of these advantages in full.

This original construction* gives added strength where needed . . . doubles the flange wall thickness, and reduces bolt hole elongation to a minimum. Feature of Hubbard design is the double flange thickness with rolled shoulder extension that reinforces the traverse at the joint between reel head and traverse flange.

Available in all standard sizes and finishes. Send for complete information.

HUBBARD SPOOL COMPANY

1624 Carroll Avenue • Chicago 12, Illinois

Hubbard

STEEL SPOOLS AND REELS . . . METAL BOUND
SPOOLS AND REELS . . . STEEL TRAVERSES
LIGHT WEIGHT REELS . . . WOOD REELS

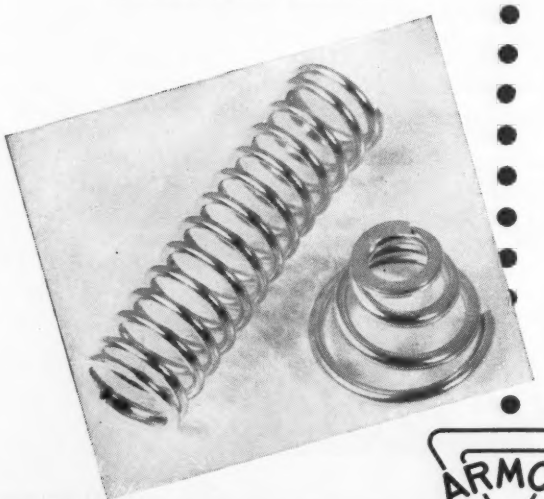
*patent pending

you get big advantages

with this new spring wire

What it gives your products

High Elastic Properties
High Tensile Strength
High Torsional Strength
High Fatigue Resistance
Low Deflection
Low Permanent Set
Low Elastic Drift
Good Corrosion Resistance



Springs made of ARMCO Special 16-2 Wire.

If you can use stainless steel spring wire to advantage you'll want to know about the many excellent properties of new ARMCO Special 16-2 Spring Wire.

Special mill processing gives this new spring wire exceptionally high elastic properties and low drift. Its elasticity is indicated by these data:

Wire Diameter, Inch	Proportional Limit in Tension 1000 psi
.0365	264
.060	206
.291	170

Low Permanent Set

Another outstanding characteristic of ARMCO Special 16-2 Spring Wire is its low permanent set at elevated temperatures. How well this special wire maintains load-carrying properties at elevated temperatures is revealed in these comparative tables:

Stress 40,000 psi	Temperature 650° F.	
Material	Permanent Set After 812 Hours	Permanent Set After 600 More Hours
Music Wire	40.0%	No Data
18-8 Stainless Steel	14.0	19.0%
ARMCO Special 16-2	6.4	6.4

ARMCO Special 16-2 Spring Wire is supplied in coils or straight lengths, with a standard cold-drawn finish or with a lead coat for use on automatic coiling machines. It is available for immediate delivery. Write to the address listed below for your free copy of the descriptive booklet titled "This New Spring Wire Gives Your Products 8 Big Advantages." The American Rolling Mill Co., 114 Curtis St., Middletown, Ohio. Export: The Armco International Corp.

ARMCO

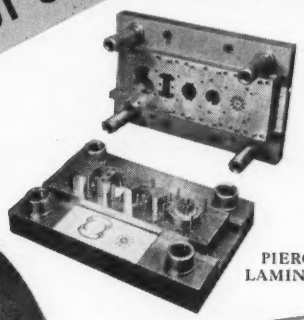
ARMCO Stainless Steel Wire

Talide (TUNGSTEN CARBIDE) Drawing Dies

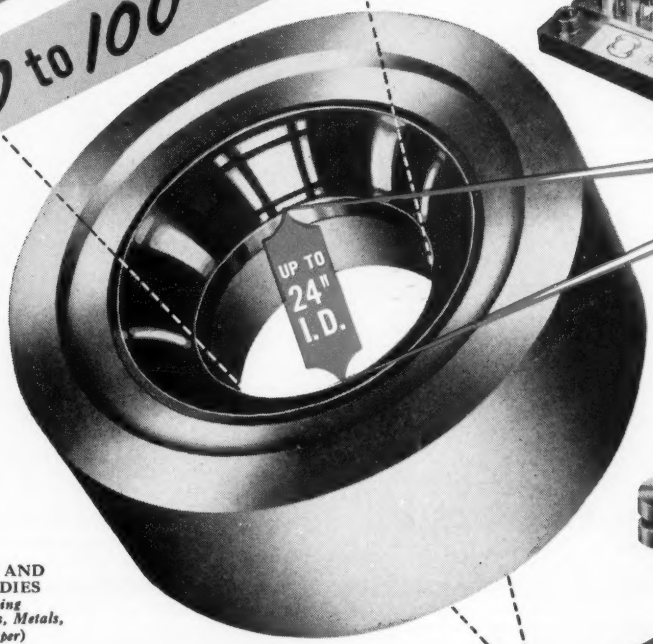
20 to 100 Times the Life of Steel Dies

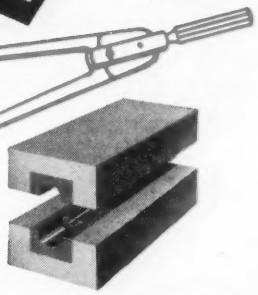
DRAWING DIES
(For Wire, Tubing and Bar Stock)

SPINNING AND CURLING ROLLERS

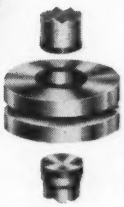


PIERCING AND LAMINATION DIES





SWAGING DIES
(For Forming Solid and Tubular Shapes)



POWDER METALLURGY DIES *(For Compacting Powdered Metals and Materials)*

BLANKING AND FORMING DIES
(For Stamping Lamination Discs, Metals, Plastics, Paper)

Isn't low unit cost your ultimate objective? You get more speed and output on long production runs and at lower maintenance cost with the superior quality of Talide Dies. Talide Dies out-perform and out-wear steel dies 20 to 100 times. Talide (the hardest metal made) saves up to 50 hours polishing and redressing time on a single die. And, since Talide Metal takes and imparts the smoothest finish possible, surface defects are practically eliminated. Purchase Talide (tungsten carbide) Dies in any practical shape and of inside diameter up to 24".

Write for Die and Wear Part Catalog 46-WP.

Talide (TUNGSTEN CARBIDE) Performance!

TUBE MANDRELS

HEADING AND EXTRUSION DIES
(For Shaping and Sizing Bolts, Nuts, Screws, and Collapsible Tubes)

TALIDE METAL MEETS EVERY REQUIREMENT

SINTERED CARBIDES — METAL CARBIDES CORPORATION — TALIDE — YOUNGSTOWN, OHIO — HOT PRESSED CARBIDES

METAL CARBIDES CORPORATION

YOUNGSTOWN 5, OHIO *Pioneers in Tungsten Carbide Metallurgy*

CUTTING TOOLS · DRAWING DIES · WEAR RESISTANT PARTS

Rolock, Inc. engineer tells
How to Build **BETTER** Brazing Trays

"Our customer's organization has adopted as standard design the 1/4 in. by 1/16 in. Inconel flat wire brazing trays with riveted U-binding corner construction."

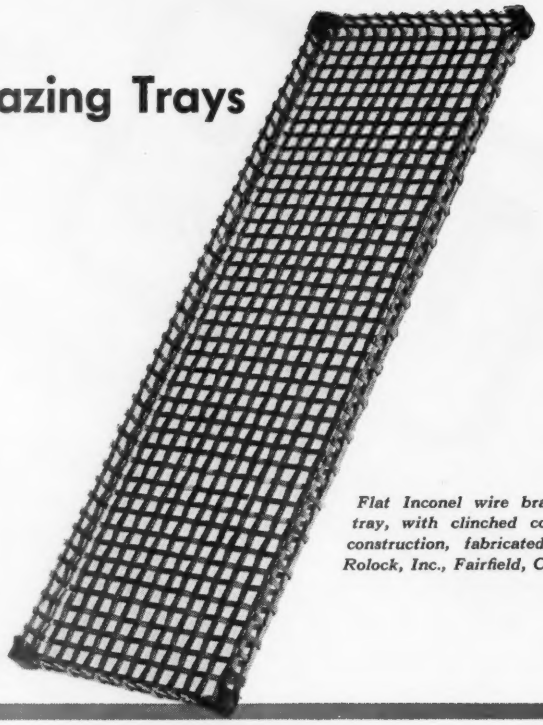
That is what Mr. C. H. Weber, Jr., engineer of Rolock, Inc. – builders of heat-treating equipment – reported recently in a technical journal. To determine how the cost of large-scale copper brazing operations could be reduced, a manufacturer undertook a service test of brazing trays.

The test trays were fabricated by Rolock, Inc. Two types of construction were tested. These were:

1. .120 in. diameter round Inconel* wire, 1/2 in. x 1/2 in. center-to-center mesh. All-welded construction.

2. 1/4 in. x 1/16 in. flat Inconel wire, 3/4 in. x 3/4 in. center-to-center mesh. Riveted U-binding on corners.

Mr. Weber tabulates the test results as follows:



Flat Inconel wire brazing tray, with clinched corner construction, fabricated by Rolock, Inc., Fairfield, Conn.

Service life. Hours exposed at 2050°F.	Mesh Specifications	No. of times exposed at 2050°F.	Observations after service
29.9	round Inconel wire	225	No scaling; material ductile, several cracked corner welds (no corner clips). Tray could probably be repaired for further service.
104**	flat Inconel wire	742**	Still in service. Some wires have warped.

**Note that these figures are incomplete since the tray was still in use at the time of reporting.

It is clear from these figures that the flat Inconel wire construction with no welding gave more than 3 times the service of the welded round wire type. The promise apparent in the test results has been borne out in practise. Mr. Weber reports:

"The manufacturer, with many such trays in service, has reported substantial annual savings in brazing furnace operating costs."

This is a typical INCONEL story! If you have heat-resisting equipment problems, it will pay you to investigate Inconel's unusual combination of properties without delay.

*Reg. U. S. Pat. Off.

For further information, write for your copy of "For Long Life at High Temperatures." It is free.

SAVE WITH INCONEL THERMOCOUPLE PROTECTION TUBES

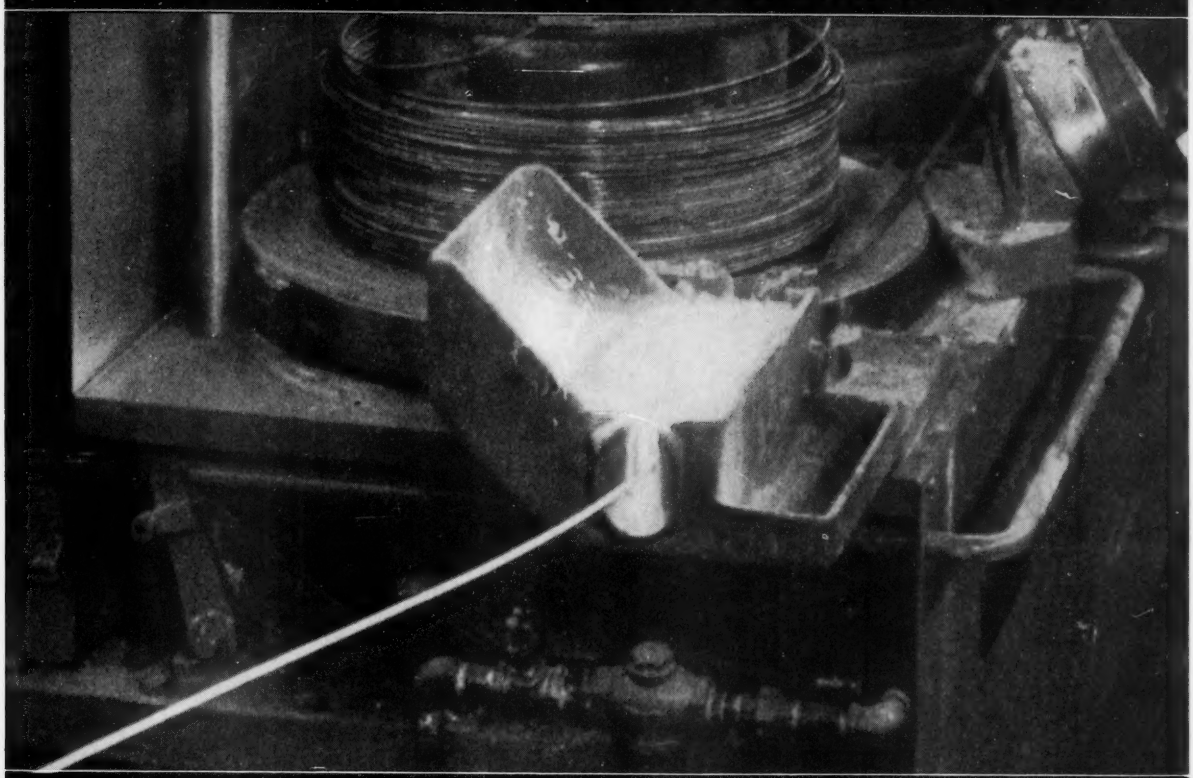
These strong, shock-and-corrosion resistant seamless Inconel tubes can be used in sulfur-free atmospheres up to 2200° F. Your supplier stocks them in various sizes and lengths.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York 5, N. Y.

INCONEL* ...for long life at high temperatures

(80 NICKEL-14 CHROMIUM)

REAL FOLLOW THROUGH . . . NO MATTER HOW HARD THE DRAW!



That's What You Get, Plus Excellent Slip,
When You Use Magnus Dri-Draw Compounds

MAGNUS DRI-DRAW COMPOUNDS were designed to provide effective adherence to the metal, adequate slip and a special ability to follow the metal through the die, no matter how hard the draw.

DRI-DRAW #4 has been unusually successful on difficult draws on low carbon steel, as well as on stainless and high carbon wire. It gives you a very tenacious film of exceptional strength with minimum effect on die life. Finish is very bright — especially on stainless wire.

DRI-DRAW #6 is an all-around compound in extensive use on all dry drawing operations where the special properties of #4 are not required.

Magnus Dri-Draw Compounds have not only proved their superiority in the draw, but have been and will be consistently maintained at top quality regardless of the raw material situation.

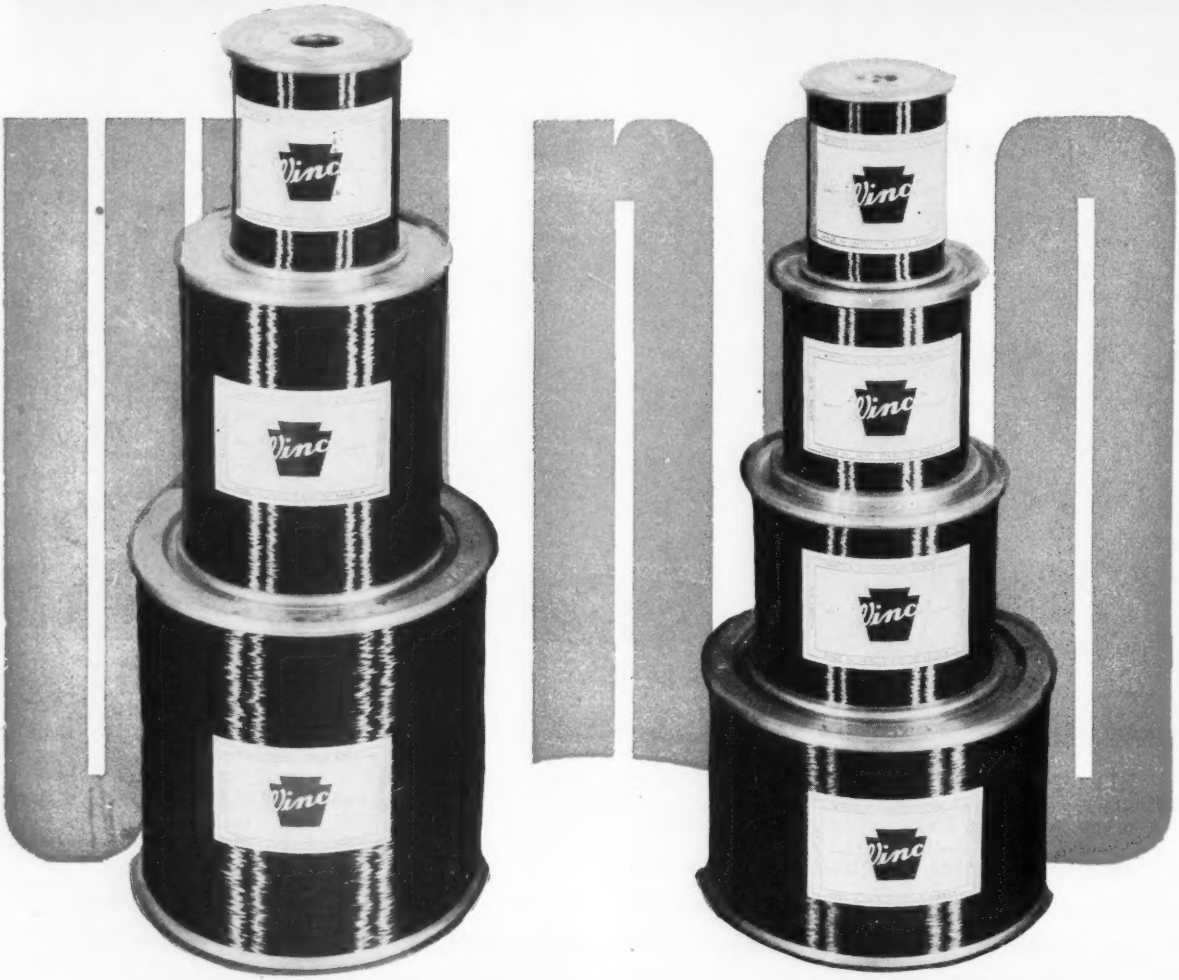
MAGNUS CHEMICAL COMPANY
188 South Ave., Garwood, N. J.
IN CANADA – MAGNUS CHEMICALS, LTD.
4040 Rue Masson, Montreal 36, Que.
Service representatives in principal cities.

IN WIRE DRAWING IT'S
Magnus
CLEANERS • EQUIPMENT • METHODS

Limeless Wire Drawing with Metal Coat #267

Cuts costs . . . insures longer die life . . . gives a better finish . . . causes fewer scratching rejects . . . insures lower lubricating costs. No expense and mess of liming and baking . . . ultimate cost per ton of drawn wire much less than with lime.

ENAMELED COPPER	TWISTED MULTIPLIES	CELANESE COVERED
ENAMELED IRON	PARALLEL MULTIPLES	GLASS FIBRE COVERED
ENAMELED ALLOY	SILK COVERED	LITZENDRAHT AND
ENAMELED ALUMINUM	COTTON COVERED	SPECIALS TO ORDER



There's more to present day engineering and design problems than shortages of materials, priorities, etc. There is also the question of whether specifications have been rigidly adhered to. Wire, for example, must meet such requirements as specific electrical properties, flexibility. tensile strength, laying speed, uniformity, etc.

Whether it's a buyer's or seller's market. WINCO magnet wire products are drawn to exact specifications. Uniformity of product is guaranteed by mercury process tests and careful supervision guards against variations in consistency, structure or electrical values.

If you have a wire problem, our complete facilities are at your disposal. Send blueprints or specifications for recommendations. without obligation. Samples sent on request: write today.

WINSTED DIVISION

HUDSON WIRE COMPANY

WINSTED CONNECTICUT

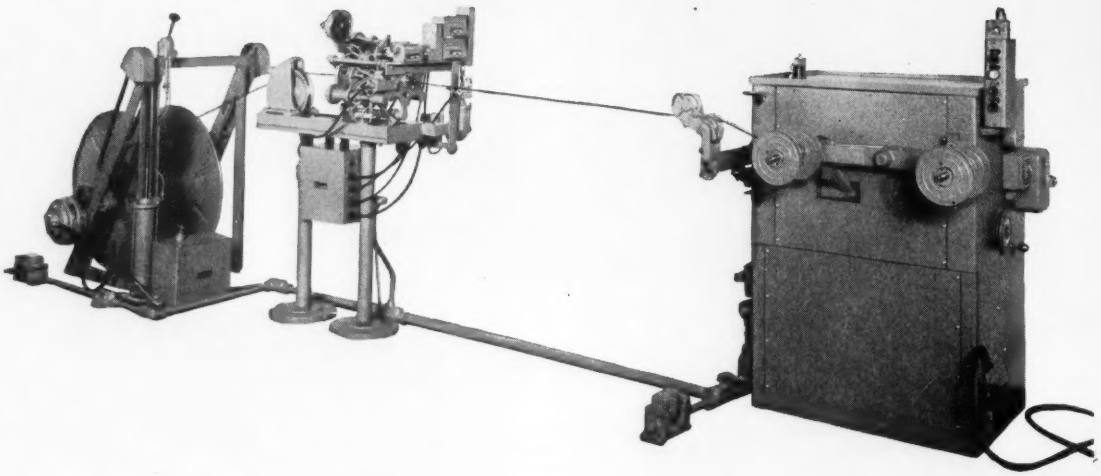
STRENGTH
and FLEXIBILITY
Always "Firsts" in
Youngstown RopeWire
Dragline Coming Up!
THE dredge which keeps the channel in New York harbor navigable must do its work surely. The wire rope operating the suction drag must run over sheaves smoothly, must resist the corrosive action of seawater, must stand the tug of vicious currents and the drag of mud and sand through years of continuous service.
Wire rope of any given design is only as good as the wire from which it is woven. That's the reason why so much of the wire rope used on tough jobs like this is made from Yolectro High Carbon Rope Wire. This wire is produced from finest steel, drawn to exacting specifications. Chemically and physically, it is designed to provide the right balance of strength, flexibility, toughness and corrosion resistance--a quality product for severe service.
QUALITY
YOUNGSTOWN
SERVICE
YOUNGSTOWN
THE YOUNGSTOWN SHEET AND TUBE COMPANY
GENERAL OFFICES - YOUNGSTOWN 1, OHIO
Export Offices - 500 Fifth Avenue, New York City
Manufacturers of
CARBON - ALLOY AND YOLOY STEELS
Bars-Rods-Wire-Cold Drawn Carbon Steel Rounds-Electrolytic Tin Plate-Coke Tin Plate-Pipe and Tubular Products - Sheets - Plates - Conduit - Tie Plates and Spikes
Photo—Courtesy Preformed Wire Rope Information

JLE

Automatic SPOOLING, SPARK TESTING and MEASURING EQUIPMENT

for use in spooling cords or in making small coils

(up to 16" O. D.)



Shown is Automatic Spooling and Measuring Equipment without Spark Test Arranged For Measuring Both Smooth Conductors and Twisted Pair.

Can Be Furnished With or Without Spark Test Equipment and With Measuring Equipment For Smooth Conductors Only or for Smooth Conductors and Twisted Pair. Capacity 250,000 feet per 8 hr. day.

JAMES L. ENTWISTLE CO.

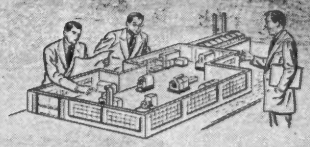
43 CHURCH STREET, PAWTUCKET, RHODE ISLAND

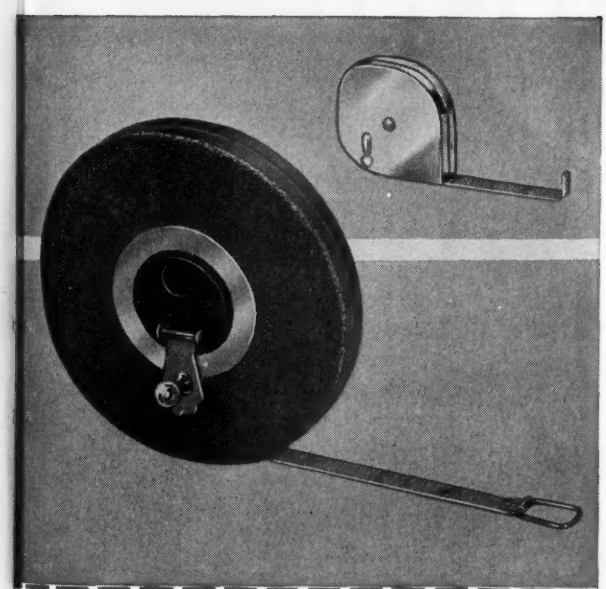
World's Leading Manufacturer of Spark-Testing Equipment

Canadian Representatives:
THE A. R. WILLIAMS MACH. CO., LTD.
64 FRONT ST. W.
TORONTO, ONT.

British Associates:
GENERAL ENGINEERING CO., LTD.,
BURY ROAD, RADCLIFFE,
LANCS., ENGLAND

Confidence- WITH ITS SLEEVES ROLLED UP!





STRAIGHT AND STALWART, every factory stack is a towering symbol of man's faith in the future... industry's confidence in its ability to create and to expand production for better living and a richer world.

With confidence like that, Roebling has pioneered in developing and making an extraordinary range of products indispensable to industry. And the confidence that its products and engineering skill have earned in every industrial field is one of Roebling's most valued assets. Every Roebling employee is striving to safeguard that confidence by making products and rendering services that are of maximum utility to you.

MEASURE THIS FLAT WIRE BY ANY STANDARD

SIZE UP ROEBLING FLAT WIRE... its steel analysis, dimensional uniformity, temper, finish. You'll find it's *right* on every count . . . meets specifications and helps beat mounting production costs.

Roebling looks out for you by controlling each step in the manufacture of its flat wire . . . makes its own steel to assure the right metal composition . . . produces wire by means of modern, highly specialized equipment and techniques . . . constantly applies the results of research and development to give you the finest flat wire that can be made.

Specify Roebling Flat Wire with confidence that it will meet your requirements. Your Roebling Field man will help you determine the *right* wire for the job, and the right way of handling it. Write or call your nearest Roebling branch office.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

A CENTURY OF CONFIDENCE **ROEBLING**

★ WIRE ROPE AND STRAND ★ FITTINGS ★ SLINGS ★ SUSPENSION BRIDGES AND CABLES ★ AIRCORD, AIRCORD TERMINALS AND AIR CONTROLS ★ AERIAL WIRE ROPE SYSTEMS ★ ELECTRICAL WIRE AND CABLE ★ SKI LIFTS ★ HARD, ANNEALED OR TEMPERED HIGH AND LOW CARBON FINE AND SPECIALTY WIRE, FLAT WIRE, COLD ROLLED STRIP AND COLD ROLLED SPRING STEEL ★ SCREEN, HARDWARE AND INDUSTRIAL WIRE CLOTH ★ LAWN MOWERS

. . . WHY FIBERGLAS* 150's YARNS ARE BEING USED FOR CABLE TENSION MEMBERS?

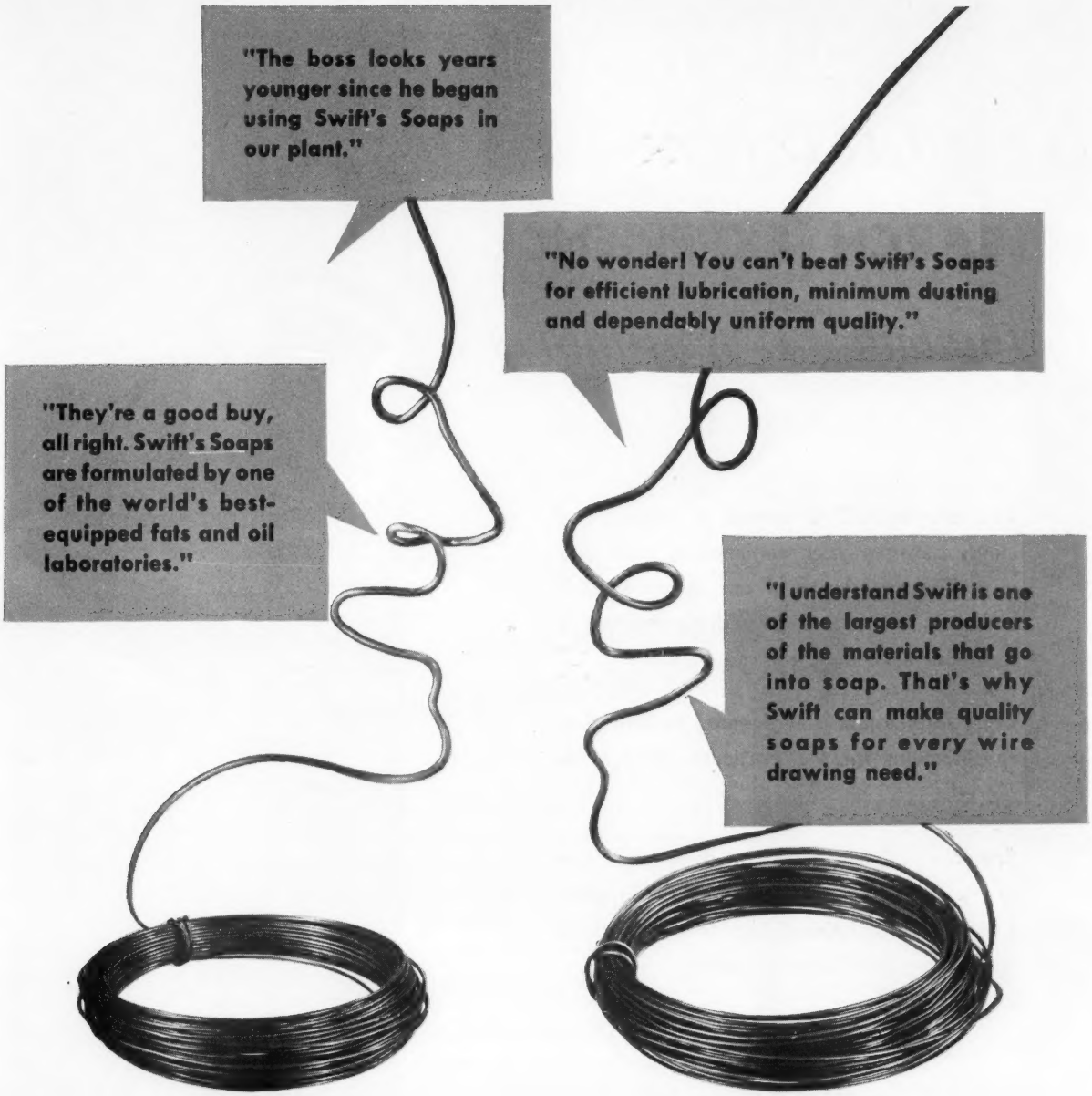
Answer: **They provide low cost . . . per unit length of yarn . . . per pound of tensile strength with minimum space occupancy**

For complete information about Fiberglas Yarns for this, and other electrical uses, write Owens-Corning Fiberglas Corporation, Dept. 875, Toledo 1, Ohio. Branches in principal cities.

In Canada: Fiberglas Canada Ltd., Toronto, Ontario.

OWENS-CORNING FIBERGLAS Yarns

*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) for a variety of products made of or with glass fibers by Owens-Corning Fiberglas Corporation.


"The boss looks years younger since he began using Swift's Soaps in our plant."
"No wonder! You can't beat Swift's Soaps for efficient lubrication, minimum dusting and dependably uniform quality."
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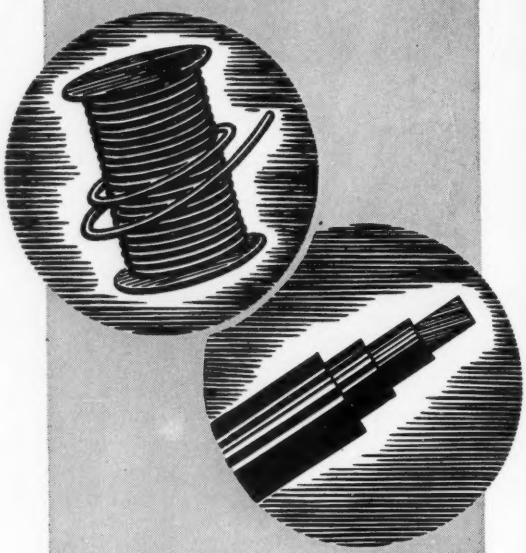

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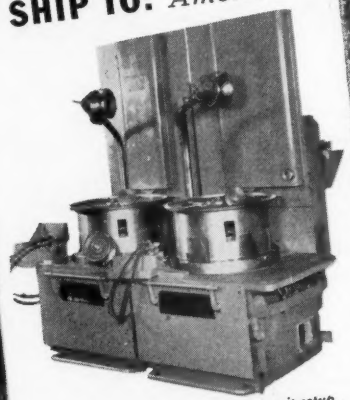
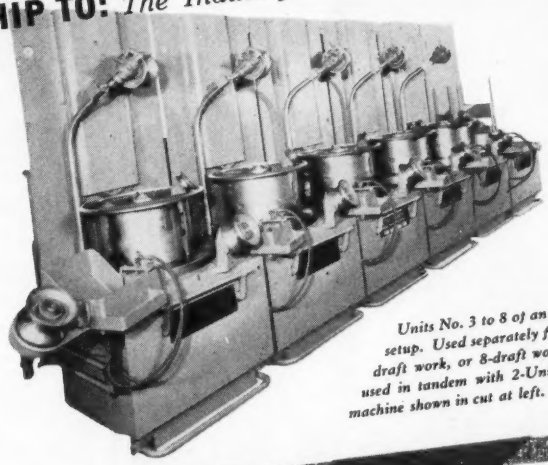
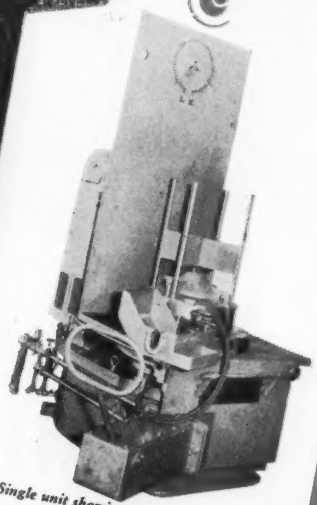


Units No. 1 and No. 2 of an 8-unit setup.

SHIP TO: *The Industry's Growing Demand*



Units No. 3 to 8 of an 8-unit setup. Used separately for 6-draft work, or 8-draft work, used in tandem with 2-Unit machine shown in cut at left.



Single unit showing construction and accessibility of parts.

Labor, time and space are elements of profitable production. You gain these advantages with the *Aetna-Standard Wire Drawing Unit.* Two or more *Units* may be used in tandem with automatic-rheostatic control. The vertical motor on each *Unit* saves floor space and is readily accessible. *Aetna Wire Drawing Units* are available in four sizes (No. 30, No. 22, No. 16, No. 12) for production of heavy, medium and light gauges of carbon steel, alloy steel and non-ferrous wire. Consult us about your wire drawing requirements.

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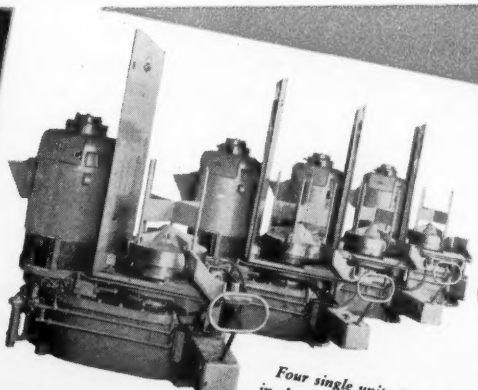
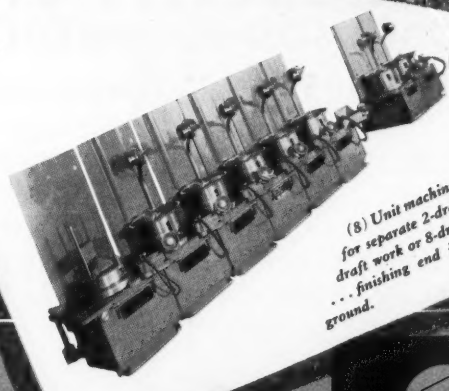


Four single units for use in drawing heavy stainless steel wire.



(8) Unit machine arranged for separate 2-draft and 6-draft work or 8-draft work . . . finishing end in foreground.

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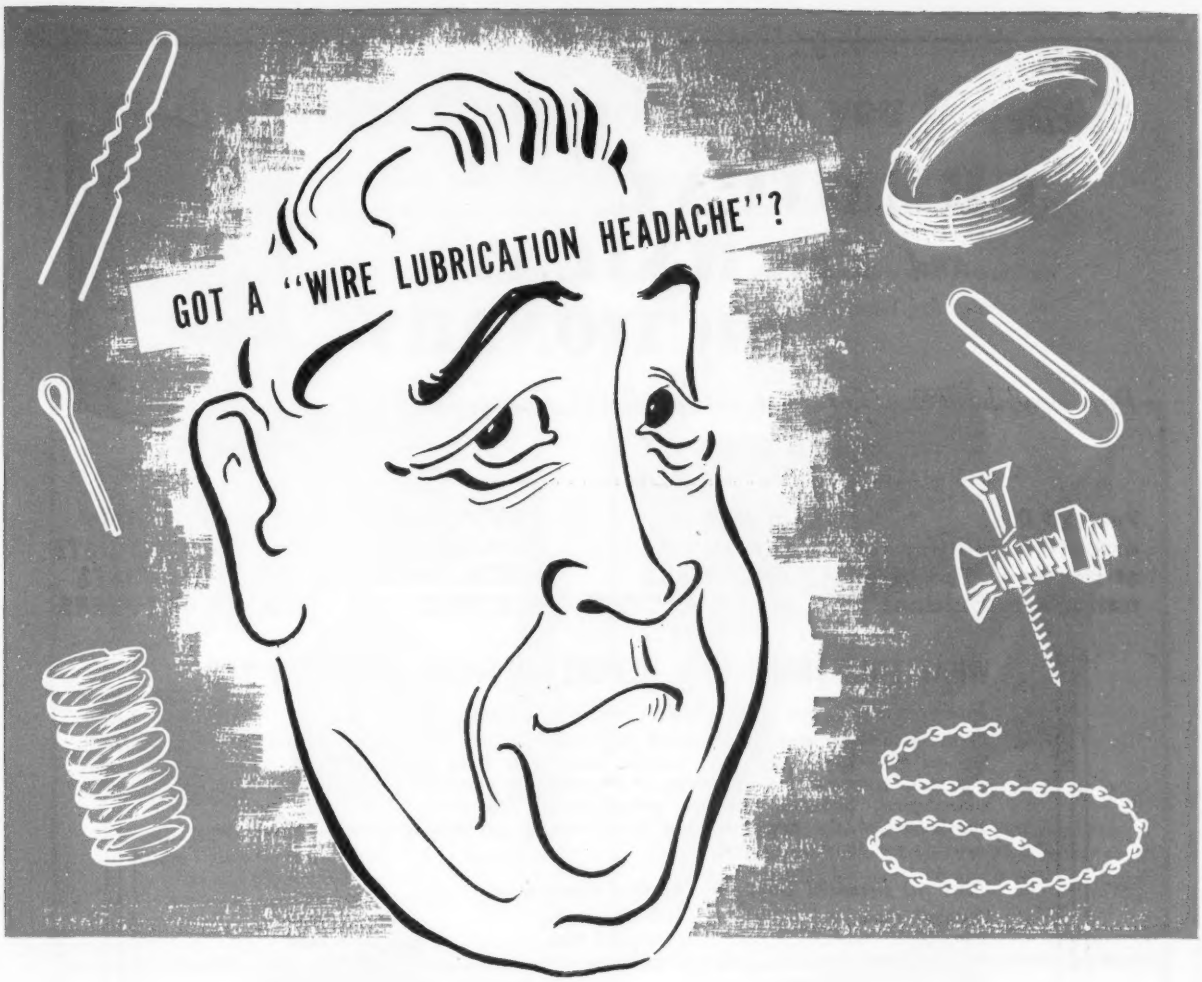

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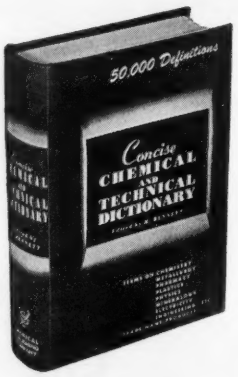

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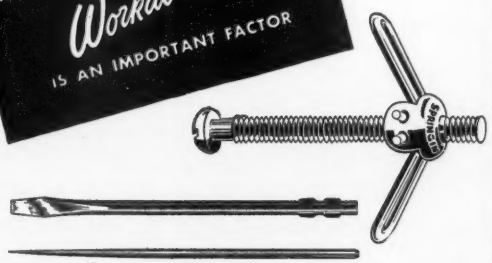

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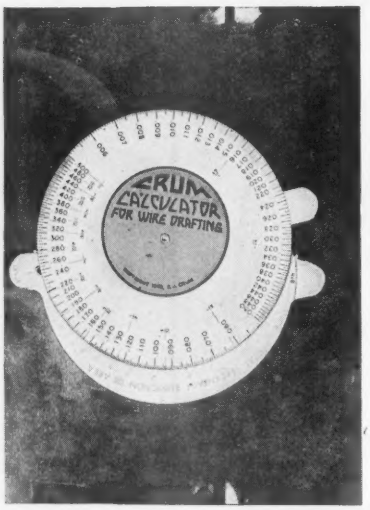
* * *



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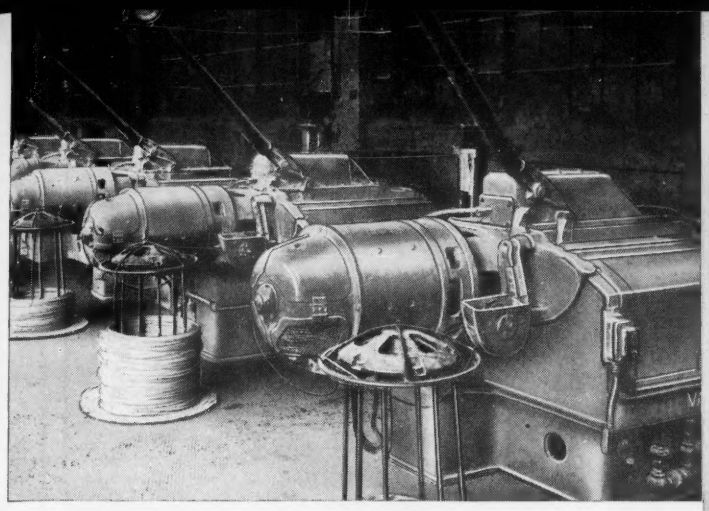

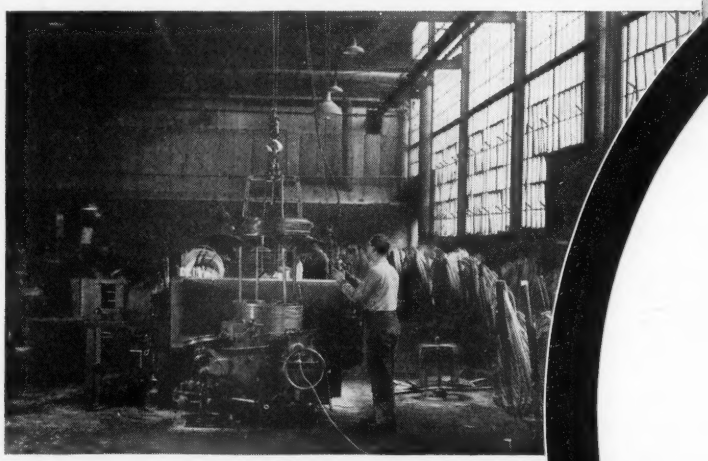

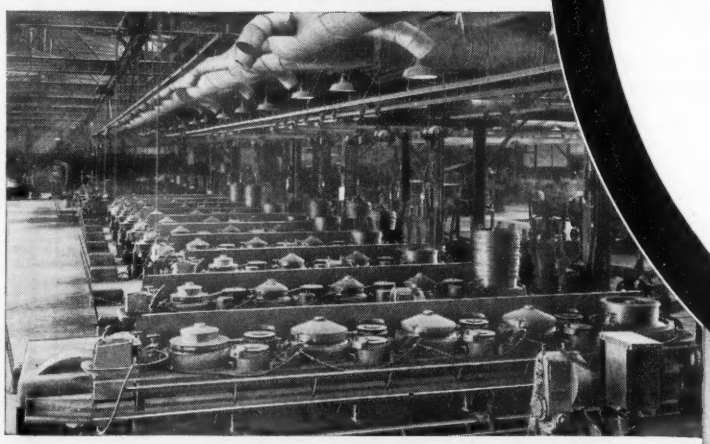

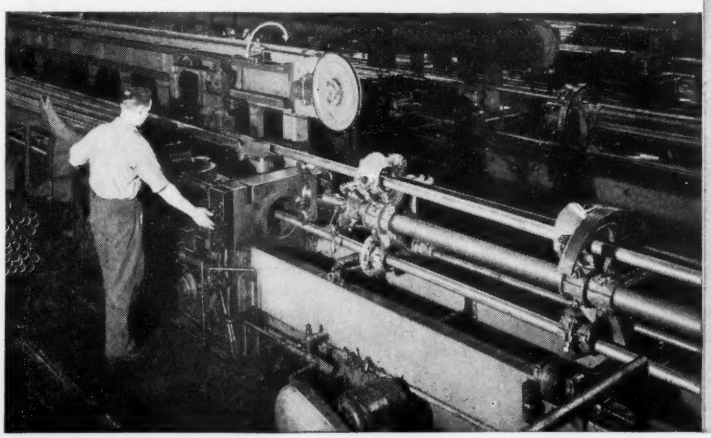

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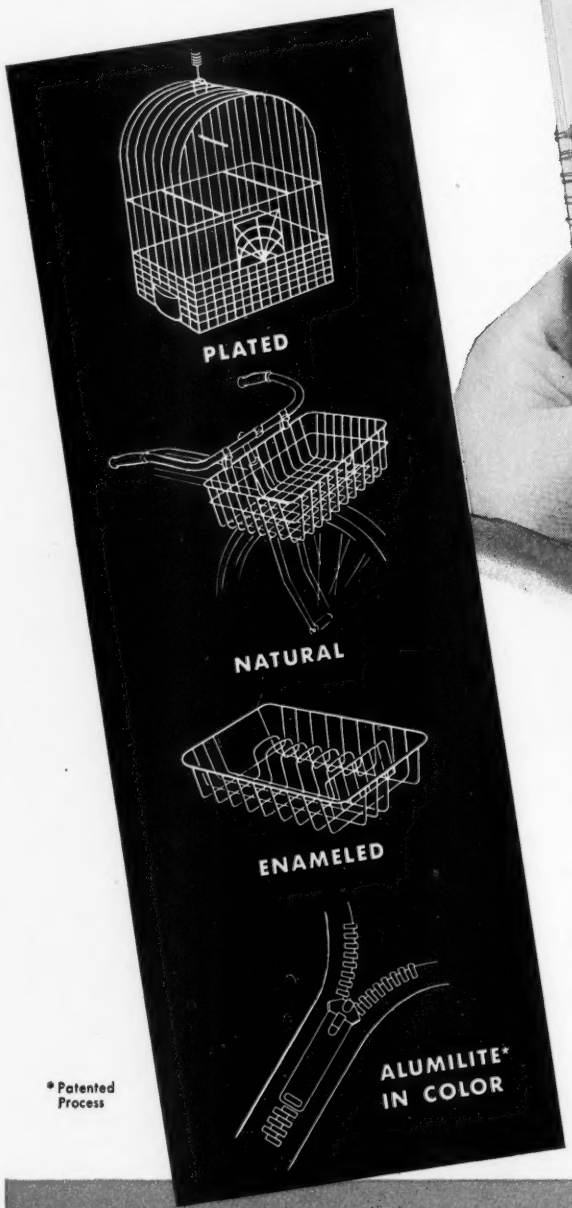

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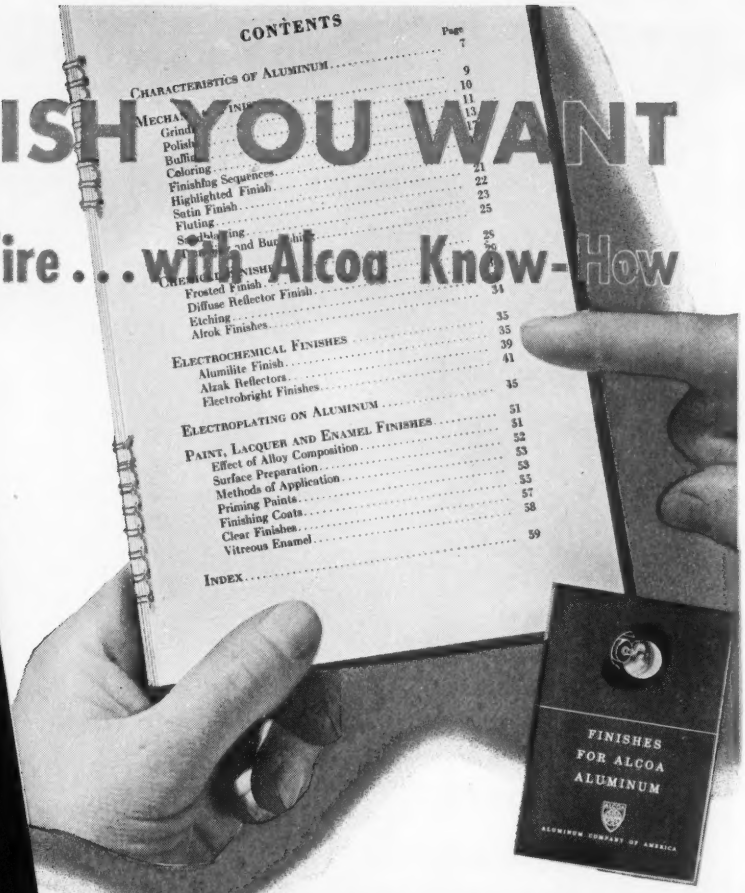

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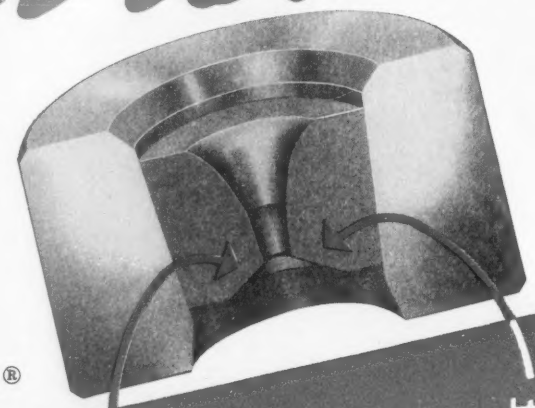

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The Wire Outlook

Much publicity was given to the views of prominent economists in 1947 in which there was a general concurrence of opinion that the latter part of the year or the early part of 1948 would see an economic recession.

Now the experts have cleared us through the first half of 1948. Of course, anything can happen, but it stands to reason that the great shortages of goods at home and abroad should establish a sound basis for continued high production levels for a long period.

Inflation and deflation are the products of numerous interrelated factors. The Government's undue extravagance during the war years and since are behind the present upward spiraling of prices. Its current policy of supporting the prices of many staple aaricultural items contributes to the trend. It is becoming more widely recognized that inflation — or its reverse — stems primarily from the policies of government, and not from business.

We are practically committed to the E. R. P., which can hardly fail to aive prices a further stimulus, proponents of the plan to the contrary. The thing of which we need to beware, is not a deflationary corrective, but of inflation getting out of hand. Price and wage controls could only briefly halt the trend. Only a sane and realistic appreciation of the causes, followed by corrections, can level off the spiral.

One can hardly blame industrialists for wondering whither we are tending, yet to their credit, faith and hope, American manufacturers invested the amazing total of $16,000,000,000 in 1947 for new factories and equipment. This retooling, for much of it is just that, is motivated by the need to produce more cheaply. Much of the equipment that served in a low-wage era, must now be scrapped to prevent prices from getting to such levels that no one can buy the products of industry. It has been estimated that there are still 1,000,000 metal-working units that must be replaced to bring production facilities to a point of maximum efficiency.

In the steel industry, increased efficiency has held price increases to an average of 38 per cent against a general increase in the cost of materials, supplies, labor and services for the making of steel, of 70 pert cent. Meanwhile, the wholesale price of food has risen 156 per cent.

A better wire rod supply to non-integrated mills is reported here and there, but it is not yet general nor adequate. The improvement has been more in high carbon than low. Mills using cold heading wire find their inventories out of balance and often at a critical point. Fastener products will operate below capacity as long as the condition exists.

Nail production in 1947 amounted to about 800,000 tons. Approximately 850,000 are estimated to be needed for 1948 and some large mills, anticipating the demand, are buying additional nail machines.

The demand for upholstery spring wire is heavy, but the supply of oil-tempered spring wire appears to be adeauate. Wire rope inventories are growing and a good supply of building wire is readily available. Automobile wire is now in fairly good supply. Total production of drawn steel wire for 1947 is estimated at 2,640,000 tons, nearly 700,000 more than in 1946.

Electric wire and cable continues in heavy demand. One large producer of textile-insulated cable reports that to meet calls upon it, production schedules for 1948 have been upped from the 60,000,000 feet produced in 1947 to 95,000,000 feet this year.

Good business is almost assured for the whole of 1948. Any "ifs" will probably be related to further government monkeying with economic laws, as, for instance, the talk about taking steps to bring about a "planned or controlled" recession. Let us hope that our system of political checks and balances functions to stop this nonsense. It probably will!

—from the Editor's Desk

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Vol. 23 FEBRUARY, 1948 No. 2

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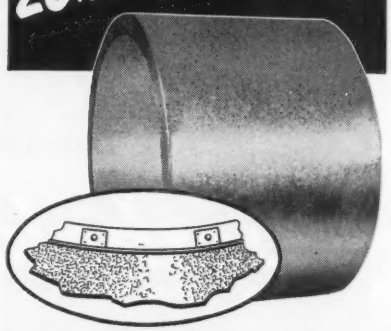
and
20% less weight



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WIRE AND WIRE PRODUCTS

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DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 23 FEBRUARY, 1948 No. 2

METALLIC COATING OF WIRE

By
Herbert Kenmore
and
Frank L. Durr

Kenmore Metals Co.
New York, N. Y.

The detailed description of an entirely new method of metallic coating of wire and some of its various applications.

THE industrial development beginning at the end of the last century has called for ever increasing quantities of wire. Many industries have found that these wires could be used to better advantage if they were coated with a secondary metal. The advantages to be obtained by coating the wire with metal may be to protect against atmospheric corrosion, chemical attack or other effects detrimental to the life of the wire or to impart to the wire an entirely new and different property or combination of properties.

* * *

ONE of the earliest methods developed for producing coated wires was by passing the base wire through a bath of molten metal having a lower melting point than the base material (called the "hot process".) This method is still the most widely used. The common applications are:

(a) zinc over steel wire (GALVANIZING)
(b) tin over copper wire
(c) lead-tin over copper wire
(d) tin over steel wire
(e) brass over tire bead wire.

* * *

UNDER this heading also comes the process of encasing a steel billet with copper in the molten state and subsequently rolling the copper encased billet to wire size. This method is used by the Copperweld Company mainly for the production of wire for power transmission lines.

* * *

SINCE more refined requirements were needed by the users of wire, the sleeving or jacketing method was developed to meet those requirements. This method consists in inserting a heavy gauge wire rod of one type of metal into a tube of another metal and drawing this "filled-tube" to the desired final size. A bonding material may or may not be applied between the tube and the rod. Examples of applications of this method include:

(a) gold filled wire—filling a gold tube with a brass rod, copper rod, or silver rod, for jewelry purposes,
(b) silver jacketing—filling a silver tube with brass, copper or bronze, for jewelry and electronic applications,
(c) Dumet wire (for seal wire in radio and lamp industry)—applying a copper tube over a 42% nickel-iron alloy rod,
Kulgrid[1] — applying a nickel tube over copper wire (for lead-in wire for radio and lamp industry).

* * *

A relatively recent development, dating within the last 20 years, is the metallic coating of wire by the electrolytic process involving the electro-plating of the wire in its final size. The most familiar methods include:

(a) the coating of zinc on steel wire—called electro-galvanizing. The most important methods of electro-galvanizing include the Tainton process[2] and the Meaker Process,
(b) the plating of nickel over copper wire for radio and power lamps — (size .010" to .040"),
(c) the plating of nickel on iron wire, (.050" — .004"),
(d) the plating of silver and gold on copper—sizes .040" and smaller for use in musical instruments, for ribbon, for textiles, uniform braids, for Christmas garlands and trimmings.

* * *

THESE are the most common methods now in commercial use. There are many more methods developed which are very promising and are mostly based on electrolytic plating replacing older methods. Some of these develcpments are:

(a) electrolytic tinning of fine wire[1],
(b) electrolytic plating of bronze on steel[2] — Patent #2,304,709
(c) electrolytic plating of brass on steel.
(d) Corronizing[4]

* * *

METALLIC coatings on steel wire have also been employed to act as lubricants in the drawing operation. The most common ap-

[1]The trade name of Callite Tungsten Corporation.

[2]Used by Bethlehem Steel Company and sold under the trade name "Bethanized".

[1]DuPont Halogen-Tin Plating Process in conjunction with National Standard Company in Niles, Michigan.

[2]Patent issued to Michael M. Rubin, Warren, Ohio, assignor to Thomas Steel Company.

[4]Patent #2,381,778 issued to James M. Schoonmaker, Jr., assignor to Standard Steel Spring Company, Coropolis, Pennsylvania; Patent #2,315,740 issued to James M. Schoonmaker, Jr., assignor to Standard Steel Spring Company, Coropolis, Pennsylvania.

plications for such lubricating functions involve,

(a) the immersion coating of steel wire in copper or brass sulfate solutions,
(b) the application of a coating of lead on stainless steel wire,
(c) the application of a coating of cadmium on stainless steel wire.

* * *

THE KENMORE METHOD is a new method of manipulating wire entirely different from methods previously employed.

* * *

IN this process the desired plating metal is deposited on a heavy gauge base wire by electrolysis in such a way that it will not separate from the base material. The so-created dual metal wire is then further processed to the desired size and temper.

* * *

THE electrolytic plating process is performed preferably at the stage where hot rolled rod is ready for the cold drawing operation. The size, depending on the material and the finished product needed, will usually be between 3/16″ and 5/16″ diameter.

* * *

THE operation in which the deposit is applied is continuous and automatic. The bare wire is fed into a specially constructed apparatus which performs all necessary operations and releases the coated wire ready for redraw.

* * *

TO give an idea of the economics, quality of product and other factors of this Kenmore process, the plating of nickel coated low carbon steel wire is discussed in detail below and then some of the various other applications of this process are summarized.

* * *

Nickel on Low Carbon Steel Plating

STARTING with a low carbon steel wire having a diameter of 5/16″ - 1/4″, a predetermined thickness of nickel is deposited thereon by the Kenmore process. The thickness is calculated in percentage of the total weight. This allows for a standard denomination for all sizes which is advantageous because when, for example, 2% of nickel by weight (equal to .0009″) is deposited on a ¼″ wire and this plated wire is drawn to a smaller size, the nickel remains the same 2% by weight regardless of the diameter of the sizes. For example, if a wire is drawn to .135″, the thickness of the deposit in inches has changed from .0009″ to .00025″ but it is still 2% by weight.

* * *

IN this plating process, the surface condition of the base metal is of the greatest importance. Great precaution has to be taken that the iron or steel of the wire base is free from slivers, inclusions, pin holes and other irregularities. There has to be the most perfect adhesion between the deposit and the base in order to be able to redraw the plated wire. Nickel is plated on steel without an intermediary copper deposit. (Photomicrographs show adhesion between deposit and core. Photo #568.)

* * *

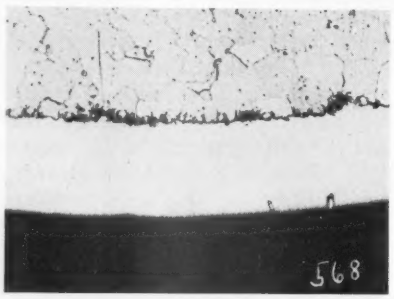

Fig. No. 568. — Photomicrograph of cross section of .25 nickel plated steel wire to show bond and plating thickness (which was found to be .00453) * * * *

Drawing

IN the Kenmore process, the pickling and liming operations are avoided as the prerequisite of drawing. Another interesting fact is that the plated metal has no influence on the method of drawing. It is the nature of the core that is the predominant factor in the choice of the drawing procedure. If the metal is low carbon steel with nickel coating, the redrawing practice for low carbon steel has to be applied. The reductions and all other conditions are the conventional methods of standard practice. This is an important factor because the cost of redrawing nickel or silver coated wire is not higher than the cost of drawing bare wire. The speed is the same as normal. Continuous machines can be used. The lubricant is the conventional dry soap. It has been found to be advantageous to add to the dry soap, a surface active wetting agent, a practice which is becoming more and more generally accepted in wire mill practice. Wire has been drawn by the Kenmore process from 5/16″ to as fine as .004″.

* * *

Annealing

IF the required wire size is beyond the cold drawing stage, the wire can be annealed in any conventional bright annealing furnace. Wire has been annealed at temperatures as high as 1900°F, without causing blistering or other damage to the coating. Normally, however, it is annealed at approximately 1200°F for three hours with a subsequent cooling down period of six hours. The wire is released from the controlled atmosphere at about 300°F.

* * *

Finishing

THE dry drawn wire takes on a "satin finish" appearance. If a bright finished wire is desired, a method has been developed by Kenmore Metals which gives a remarkable super-bright finish. The wire is drawn through dry soap in regular practice close to the finished size, preferably as close as .002″. Then the alkaline base and soap lubricant are removed by immersion in boiling water. The so-cleaned wire is then drawn through an oily, paste-like white grease with a reduction of .002″ at a speed of approximately 125 feet per minute. This practice results in a mirror-like finish of the nickel. In sizes smaller than 14 gauge, ordinary wet drawing practice will result in a high polished finish.

* * *

Welding

THE Kenmore process has shown that if the proper timing factors are observed, the wire can be perfectly spot and butt welded. It is necessary that the interval of welding be so brief that sufficient time is not available for extensive diffusion to take place. Thus, the nickel content at the connecting areas and areas immediately adjoining the welded area, remains at a high level. (The photomicrograph #105 shows a section through a welded zone). The area of alloying (diffusion) is readily noted as the darker section. It will be seen that the nickel at the weld has been squeezed out in the form of a bead which protects the material. By so processing, the protection of the metal at the weld is greater than could be otherwise achieved from products produced by ordinary methods.

* * *

Flat Wire

NICKEL coated wire can not only be drawn but also rolled into flat wire with a round edge and flat wire with a square edge. Such flat wire has been produced up to a width of ⅜". This material can fall into the category of prefinished material and can be produced with buffed or polished surface for subsequent chrome plating.

* * *

Products

THE main characteristics of the wire made by this method are: (1) the deposit is uniform through the entire length of the wire, (2) the bond between the deposit and base metal is such that the two metals cannot be separated again, and (3) the effect of the cold working creates a wire free from pin holes.

* * *

THE consequences of these characteristics are that the wire having a deposit, which being an integral part of the material, can be bent, twisted, swaged, flattened, or otherwise formed into the desired product without damaging or flaking the surface. It resists, to a great extent, corrosion. For example, a high carbon wire which was plated with nickel and drawn to .107", buffed and chromium plated, has been submitted to a salt spray test. The average thickness of the nickel plating was 0.001419. The average thickness of the chromium plating was 0.000030. Three samples out of four started to show a corroded appearance only after 190 hours. The same samples showed only 25% of surface corrosion after 400 hours. The test was conducted in accordance with ASTM specifications B117-44T.

* * *

FOR a quick test, advantage is taken of the characteristic of copper depositing on exposed steel by immersing the wire in copper sulfate and noting any red points which indicate the presence of steel or pin holes.

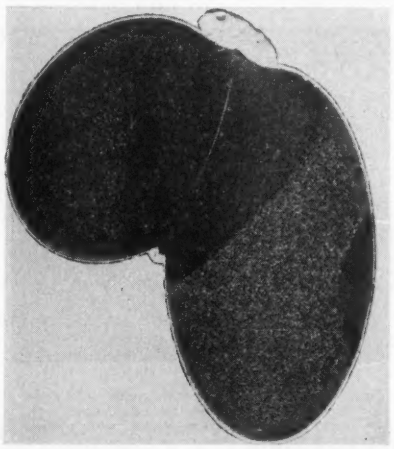

Fig. No. 105 — Section through weld made by Kenmore nickel plated iron. * *

ONCE volume production is achieved, this wire will necessarily become a widely used "raw material" due to the fact that it is a completely uniform product well protected by an attractive plating. Volume production will establish a price competition with wire plated by "hot melt" processes.

* * *

High Carbon Base

THE same method of plating and drawing as that used on low carbon steel is employed in plating nickel on high carbon steel. One limitation here, however, consists in the fact that redrawing can only be done to the hardest temper of the wire without the possibility of repatenting. Thus, wires finer than .080 have not been made yet.

* * *

ONE quarter inch music wire and #5 spring wire have been coated and drawn to their maximum drawability. Tests are still under way on this operation.

* * *

THE advantage of using the Kenmore method in the making of springs is obvious. For example, extension springs would receive protection around the complete diameter of the wire, whereas in plating after fabrication, as it is done today, only a small part of the diameter has been plated. Furthermore, the difficulty of hydrogen embrittlement is excluded since the wire is plated in the patented stage and is then drawn with the coating to spring temper.

* * *

TO give an approximate idea of the variations and combinations possible in the Kenmore method, other wires which have been made in commercial quantities by this method are described below.

* * *

Copper on Low Carbon Steel Wire

FOUR percent by weight of copper has been coated on ¼" wire which has been drawn to .020" and this drawn wire is employed for lamp leads replacing copper wire.

* * *

Nickel on Copper

HERE, five percent nickel by weight is plated on ¼" die scalped copper wire and drawn to .020", .016", and .010" and .0064". This wire is used in the radio industry for ordinary and high power tube leads. The nickel coated surface protects the copper from oxidation and failure. Another use for nickel coated copper wire is for con-

ducters where operating temperatures above 150°C are anticipated. At higher operating temperatures, copper conducters oxidize quite rapidly becoming black and brittle and finally electrical failure results. The conducters now employed for high operating temperatures are made from solid nickel. (Photomicrograph #207 showing bond between copper core and nickel coating). The solid nickel conducters have only approximately 16% of the conductivity of copper. The new nickel on copper wire has a conductivity as high as 95% of copper and still has the high temperature resistant properties of solid nickel. The wire can be annealed in its final state and stranded. Such types of conducters are generally asbestos insulated and are very advantageous in the appliance field, for special heaters and high wattage lamps.

* * *

Dumet Wire

THIS wire is the indispensable product of the lamp and radio industry. Its characteristics are critical because it has to fulfill so many purposes. First, it has to have the same coefficient of expansion as soft glass. It has to form the perfect seal between the lead-in wire and the glass to create the perfect vacuum necessary in lamps and tubes. It has to carry the current into the lamp and be capable of being easily welded to the grid rods. This wire is so difficult to make that only three concerns in the United States have manufactured it. All employ the jacketing method described before.

* * *

THIS wire has been made in commercial quantities by the Kenmore process by electro depositing the necessary amount of copper, 22% by weight, on a nickel iron alloy core of .180" diameter, increasing the total diameter to .200". The wire is then drawn through as many as 26 dies and twice annealed at 1300°F to the desired size of .016". This is a marked improvement in the manufacture of this type of wire and should result in considerable cost saving for the radio and lamp industry.

* * *

Copper on High Carbon Steel Wire For Power Transmission Lines

AN interesting product results from the deposition of 30% copper on high carbon steel using .200" bare steel wire coated with copper and then drawing to .106". We have produced wire with a

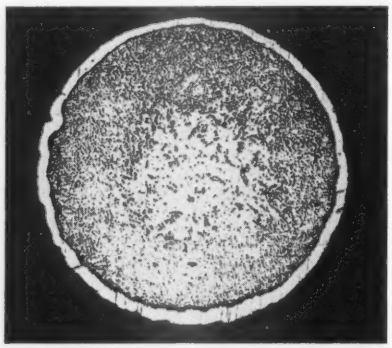

Fig. No. 207. — Photomicrograph of cross section of .010" nickel plated copper wire to show bond. Wire was drawn with plating surface from ¼" wire. * * *

tensile strength as high as 280000 psi on this size wire. Here the greatest advantage consists in the concentricity of the copper coating and the flexibility of the process, making it possible to manufacture a finished product having very high tensile strength.

* * *

Silver on Copper

THE same method is employed as that for depositing nickel on steel. A ¼" copper wire is coated with any desired thickness of silver. The jewelry industry generally requires 10% of silver by weight in a .050 wire. A copper wire with only 1% coating of silver is useful in the tinsel trade. This wire is drawn to .0035" and flattened into ribbon. Where a very critical coating tolerance on the finished product is required, the Kenmore method allows extremely close control.

* * *

AS an example of the close tolerance possible by the Kenmore process, there has been manufactured a phosphorbronze wire where the specification was: Final size .032" plus 0" minus .005"; thickness of silver coating .005" plus or minus 2%; hard temper ASTM B-159-44T.

* * *

Other Applications

THE product produced by depositing cadmium on low carbon and high carbon steel is being investigated. This product has great possibilities in the automotive and spring wire industries. Work is also being done on a new nickel alloy which would increase the corrosion protection of the coating using a combination of nickel and galvanic action. The Kenmore process is also practical for obtaining a deposit of zinc (electro galvanizing) and is being further investigated.

* * *

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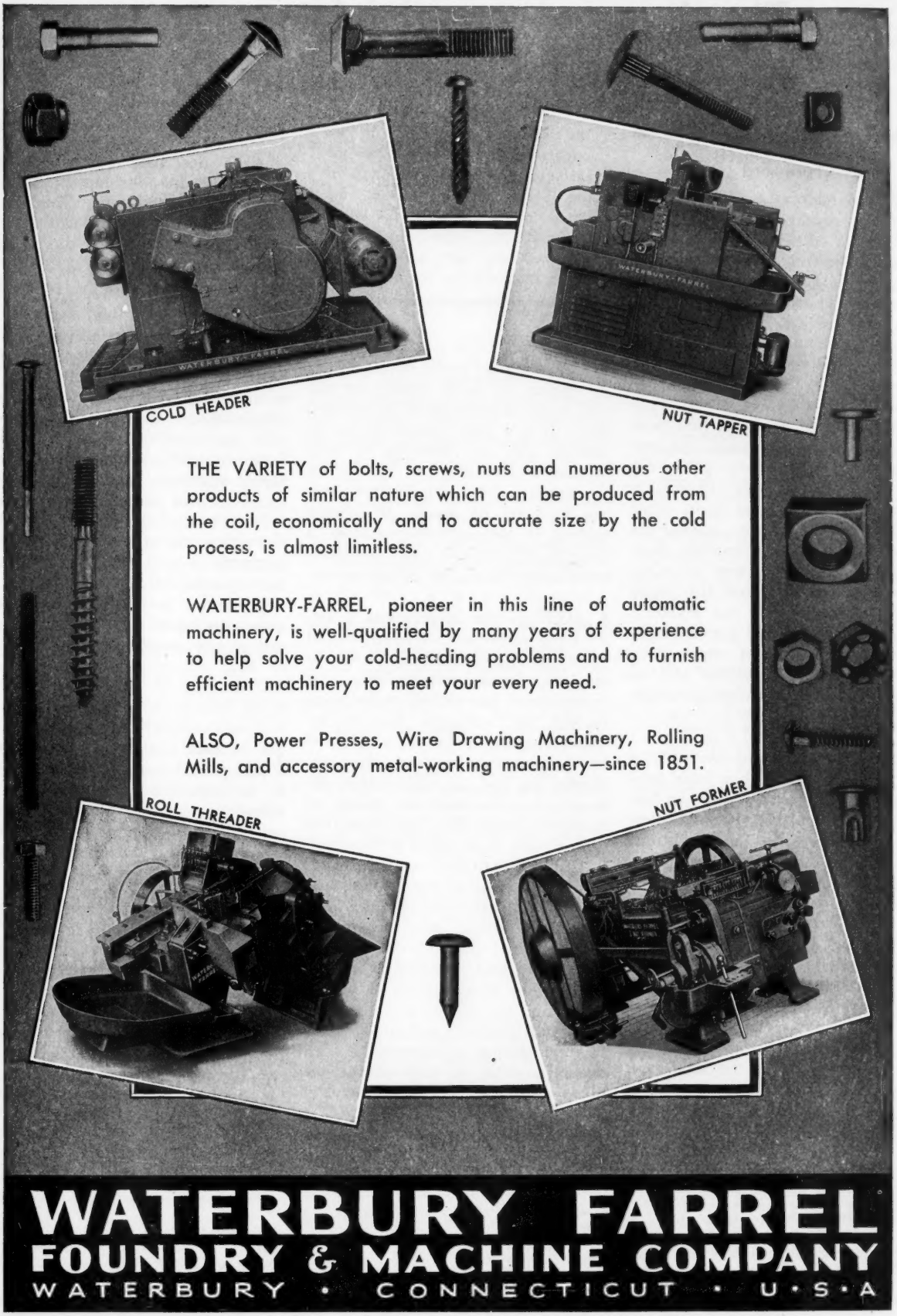
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The Inspection and Maintenance of Diamond Wire Drawing Dies

Foreword

THIS is mainly a plea for the better care and systematic inspection of diamond dies which, though often not treated as such, are valuable tools and also delicate pieces of apparatus, whose useful span of life is frequently very seriously curtailed by careless handling, and some times even by abuse.

* * *

THERE can be no doubt that even in the same wire-mill, the expectation of life of any given die will depend to a great extent on the operator who uses it; in other words, some operators appear to have far more die trouble than others. The same is true of wire-mills as a whole. About this there can be neither doubt nor mystery. Certain operators and certain mills get the best out of their dies, whilst others just grumble and do nothing about them except complain to the makers.

* * *

DIE users are prone to criticize new dies which they have purchased, but sometimes show an unfortunate complacency and tolerance in respect to the conditions of dies which they have had in use for some time, or which have been re-bored.

* * *

TOO often dies are abused, particularly when employed in trains by wire-drawers possessing more brawn than brain, who contend that if there are six dies in the train, five of them may be scratched out of shape, but if the sixth one is perfect, by some amazing providence this finishing die produces good, straight wire.

NOTE: In referring to the various zones of diamond die profiles, the terminology used is that employed in British Standard No. 1168—1944. Reference is also made to this Standard in connexion with recommended methods of inspection and measurement of die sizes.

The information contained in this paper has been issued by the Technical Committee consisting of Die Users and Makers at the request of the Council of the British Diamond Die Federation and is published by permission of the British Diamond Die Federation.

NO management has the right to expect good performance, either in respect to wire quality or die life, from inadequately maintained dies. It is a fatal misconception to believe that the interests of production in the long run are served by keeping dies in use after they are in need of repair. It follows that it is essential to maintain a reserve to carry out even the minimum amount of die maintenance.

* * *

MOST of the larger wire drawing mills in this country and elsewhere have well equipped die servicing departments in charge of experienced and skilled technicians backed by adequate die stocks. Unfortunately the practices adopted by these technicians are often unknown to, and in some cases unsought, by, the staffs in charge of smaller plants. The fact that the larger mills have found it financially and productively sound policy to equip, maintain and staff their die servicing departments is surely sufficient proof that this expense is more than repaid. It is just as important that smaller concerns should also make provision to ensure that every die produces the maximum yield of good quality wire by maintaining a universally high standard. It is to such that these notes may possibly be of value.

The Inspection and Maintenance of Diamond Wire-Drawing Dies

1. Introduction

GENERALLY speaking, diamond wire-drawing dies undergo a repeated cycle of operations which can be described respectively as Inspection, Re-polishing or Enlarging and Wire-drawing. This cycle is repeated until, for one or more of various reasons the die is discarded.

* * *

THE purpose of this paper is to outline recommended procedures for Inspection, Enlarging and Re-polishing and to draw attention to these aspects of Wire-drawing which affect these operations. Diamond dies are used under radically different conditions for drawing different materials but many of the techniques of die maintenance are independent of the particular metal for which the die is used. In this brochure it may be taken that unless specific reference is made to a particular metal the information given applies to dies for the drawing of any material.

* * *

2. Inspection

IN normal routine a die is subjected to inspection after service in a wire-drawing machine and therefore requires cleaning before an appraisal of its condition can be made. This cleaning must be thorough.

* * *

(a) **CLEANING.** The normal treatment, which is adequate in the majority of cases, is as follows:

(i) Immerse the die in a grease solvent such as carbon tetrachloride, trichlorethylene, benzene, xylol.

(ii) Insert a suitably shaped wood point, *which may be wrapped with cotton wool, into the die aperture and rotate with pressure.

(iii) Repeat (ii) until the wiper comes away clean.

*** A suitable form of soft wood for this purpose is "peg-wood" or "dowelling" in diams. of ⅛" to ¼".**

FOR very fine dies (e.g. .001" and smaller), this method may be impracticable, and in this case the best alternative is to immerse repeatedly in the solvent and after each immersion to suck the aperture clean and dry by placing the die on a flat pedestal with a central hole connected to a vacuum pump. (The use of compressed air is not advised unless the supply is very carefully dried and filtered).

* * *

SPECIAL cases, for which the above treatments are inadequate, are as follows:

* * *

A die may be returned with a fragment of wire jammed in the aperture. This should always be removed by pressure from the back (exit side) of the die, using preferably a wooden point, a steel needle only being employed if the wooden point proves ineffective. If the die is a fine one and the wire concerned is tungsten or molybdenum, one method is to immerse the die in fused sodium nitrite and then to drop it into water. Two unfortunate consequences may, however, follow the use of this method, especially in the case of ultra small dies — (1) a deteriation in drawing performance and (2) a slight enlargement. It is therefore recommended that all dies of approximately .001" and under which become plugged with tungsten or molybdenum be demounted, treated with a suitable solvent at room temperature and remounted.

* * *

A die used with a graphite-bearing lubricant may show a dense, hard layer of graphite in its entrance side which the solvent will not dislodge. This layer should be removed with a steel needle and the operation followed by solvent treatment.

* * *

THE greatest care and skill should always be used in applying a steel needle to a die in either of the above circumstances, owing to the risk of a broken steel point lodging in the die aperture.

* * *

MARKED difficulty in cleaning a die, particularly in the drawing zone, is an indication that its polish has been destroyed in service.

* * *

(b) **METHOD of Examination.** The recommended apparatus for, and method of, examination are as described in Appendix B of British Standard No. 1168—1944. Also Appendix C of that Standard describes the recommended methods of gauging or sizing.

* * *

3. Faults To Be Looked For

THE whole purpose of inspection is to arrive at a decision as to the most economical way in which the die can be re-conditioned for further use. It is therefore necessary to decide what faults it presents for eradication.

(a) WORN OUT OF TOLERANCE. This fault is the concern of the wire-drawer rather than the die polisher but the degree of wear may influence the decision of the re-polisher as to the size to which he will re-polish the die.

(b) DRAWING RING. By this is meant a ring round the reduction angle of the die corresponding with the line of impact of the entering wire. *The depth of this ring has a marked effect on the number of useful lives given by the die, because its removal may entail a substantial degree of opening up of the die profile.

(c) EXIT CHIPPING. Unless due to defects in the diamond, this fault is usually attributable to an inadequate radius at the corner of the exit, or to the absence of the exit cone.

* * *

(d) OVALITY.* A die may be reported by the wire-drawer to draw oval wire, but the fault may lie either in the die or in the drawing conditions. Inspection should indicate which is responsible.

CAUSES attributable to the die are:

(i) Entrance and exit parts of the profile being non-concentric ("met off-centre"). This is a serious fault and may entail sacrifice of useful die lives by its eradication.

(ii) Diamond loose in its setting. The obvious remedy is to re-mount the diamond. As die makers use different methods for die mounting, users are recommended to return dies for remounting to the maker.

* * *

CAUSES attributable to wire-drawing conditions are:

(iii) Angular setting of die in die-holder.

(iv) Had alingment of the machine causing the wire to enter and/or leave the die obliquely.

(v) Unsuitable gauge, or ovality, of wire fed to the die.

* * *

(e) LOSS OF SHAPE. Loss of shape is due more to careless enlarging of re-polishing of the die than to faults in the operation of the wire-drawing machine. It should be the constant aim of re-polishing to preserve the correct shape at all times.

IF incorrect re-polishing is repeated, the die shape may be affected in one or more of the following ways:

(i) The relief may be absorbed by the enlargement of the bearing until it is virtually non-existent.

(ii) Similarly, the entrance may be absorbed by the enlargement of the reduction angle until access of drawing lubricant into the die may be hindered.

(iii) The various zones of the die profile may not be merged smoothly into each other.

* * *

(f) CRACKS. *Cracks may occur in a variety of directions depending upon a number of causes which are not fully understood. They may also vary in size from complete cracks extending across the full cross-section of the stone to incipient cracks very small in size.

* * *

A die in which the diamond is completely cracked is generally useless. It is true that a cracked die will sometimes continue to function but, if so, the

---

***This ring is to be distinguished from a ring developed in polishing due to bad technique. It is convenient to use the terms "drawing ring" and "polishing ring" to make the distinction.**
Whilst a drawing ring is undesirable, it is not necesssarily an indication of bad practice. For instance, in high speed multi-die machines with long "setting up" times it may be economically justifiable to work a die long after it has developed a drawing ring, provided that the wire drawn through it continues to be satisfactory for drawing through the next die in the set.

*** When examining fine dies under a microscope, the appearance may suggest one of these faults in what is quite a good die. In cases of doubt the final test is to draw wire through the die and examine the product (see also the final paragraph regarding the pre-trial of serviced dies).**

wire drawn is usually scored and therefore useless as finished wire, whilst if the die is used in an intermediate position an undue strain is thrown upon the die which follows it.

4. Diamond Powders

THE quality of diamond powder used and the use of a suitable grade for a particular purpose are as important as the mechanical condition of machine employed.

* * *

THE most important requirement of a diamond powder is that its particle size should be uniform. In recent years improved methods of classification have been developed as a result of which powders superior to those classified by the simple gravity sedimentation method have become available. A well classified coarse powder does not have its vigour diminished by a mass of "fines" nor does the use of a fine powder free from coarse particles result in polishing rings.

* * *

A typical particle size specification offered by one supplier is shown in Table A.

* * *

A suitable liquid vehicle in which to suspend the powder is olive oil. The mixture should be of a thin creamy consistency and should of course, be well stirred before application.

* * *

5. Machines

THESE fall into two main groups, the distinction lying in the use of either a needle (e.g. as in the Pitot or Pohenkra types) or a wire (e.g. as on the Batek type). Needle machines may be either horizontal or vertical, whereas wire machines are almost invariably vertical. A feature common to both types is the revolution of the die at a moderately high speed. In older models the needle or wire was stationary but recently motions of these elements have been introduced and these appear to have advantages.

TABLE A

Grade No.	Theoretical Range	Actual Range
10	0 — 1 microns	0 — 1 microns
20	1 — 3 "	0.5 — 3 "
30	3 — 5 "	0.7 — 5 "
40	5 — 7 "	1.5 — 7 "
50	7 — 15 "	2 — 15 "
80	38 — 43 "	38 — 43 "
90	43 — 74 "	43 — 74 "

BROADLY speaking, needle machines are better suited for "heavy" work (such as re-shaping and "ripping" for re-sizing) whilst wire machines are more adapted for gentler processes (such as finish-polishing after "ripping" and light re-sizing). Therefore needle type machines are better suited to recondition the larger sizes of die, and wire machines for the smaller dies. Dies used for drawing tungsten wire less than about .002″ in diam. are treated exclusively on wire-type machines. In shops handling a wide variety of die sizes both types of machine should be installed.

* * *

AN essential auxiliary to needle machines is a means of grinding the needle point to a controlled angle. This is necessary to ensure that the profile of the die be not radically altered in re-polishing, and to safeguard against the development of polishing rings.

* * *

THE wire used on wire-type machines may be of copper, steel, tungsten or molybdenum according to which is cheaper or more convenient. For very fine dies (below .001″) tungsten is often preferred.

* * *

6. Treatment of Faults

(a) **WORN out of tolerance.** Clearly the aim here is to open up the die to the nearest larger size required by the wire-drawing department.

* * *

THE types of machine used for the different stages of the re-polishing will depend on the amount of work to be done. Thus, for instance, an intermediate die of .040″ used in continuous copper wire drawing may require increasing in size by as much as .005″, whereas a finishing die of .005″ may need an increase of only .0002″ and the whole procedure would obviously be different in the two cases. As mentioned above, needle machines would be used extensively in the first case, and followed by wire machines, whilst in the second instance needle machines may be hardly used at all.

* * *

THE use of appropriate powders is important. The general principle to follow is the same as is observed in metallographic polishing, i.e. the use of successively finer grades, each grade being used until the marks left by the preceding grade have been removed. The degree of coarseness permitted at the commencement of operations therefore depends on the degree of opening up intended. If a very coarse grade is used, and the amount of opening up required is small, the die may reach the desired size before all the coarse marks have been obliterated; on the other hand, the use of a needlessly fine grade at the commencement will waste time.

* * *

THEREFORE, whereas final polishing should always be done with the finest grade of powder (e.g. grade 10 in table in Section 4) the commencing grade will depend on the amount of work to be done. A little experience with a particular brand of powder and type of machine will enable a satisfactory procedure to be prescribed.

* * *

THREE important points must be observed when enlarging dies. Firstly the angles of the contour must be smoothly "blended"; this is usually achieved on a wire machine by using an offset wire, or by using a machine in which the die rocks whilst rotating. Secondly, if the degree of enlargement has been sufficient to absorb the relief, this must be restored; this operation is conveniently done using a needle at the back of the die, following by wire polishing with an offset wire to "blend" the cone left by the needle with the parallel. Thirdly, if the entrance and approach angles have been encroached upon, they too must be restored.

* * *

A die worn out of tolerance has usually seen considerable service and other faults are frequently present.

* * *

(b) **DRAWING Ring.** If the drawing is not very deep it may be possible to remove it without unduly shortening the length of the die parallel, and if so, the die can be put back into service at the size at which it came out. Being in the reduction angle of the profile it can be removed by using a needle of the appropriate angle.

* * *

HOWEVER, the drawing ring is often too deep to be removed without a marked effect on the length of parallel, and with its removal an increase in the die size becomes necessary. In this instance the die is treated as if "worn out of tolerance".

* * *

IN treating drawing rings particular attention must be paid to the matching of the angle of the needle point with that of the reduction angle of the die.

* * *

(c) **EXIT Chipping.** The exit cone should be made larger until the chipped zone is absorbed, but the finished die should be examined carefully for residual incipient cracks.

* * *

IF the chipping is serious, the die will have to be discarded.

* * *

APART from defects in the stone, the commonest cause of exit chipping is the absence of an exit angle, or of a smooth blending of this with the parallel. As mentioned above, attention should be paid to these two points in all re-polishing work.

* * *

(d) **OVALITY.** The treatment of a die which shows ovality usually consists of opening up to a larger size, the ovality being eradicated in so doing. Details of the procedure vary very much according to individual cases but the general principle described under "Worn out of tolerance" should be followed.

* * *

IT may be necessary to open up to an unusual degree before the ovality is corrected, thereby losing useful lives.

* * *

(e) **LOSS of shape.** Loss of shape is referred to in Section 3 (e). It is avoided by systematically treating a die so that every portion of its profile is appropriately treated. It is obviously important that needles must be correctly ground to the appropriate angles and that the polishing head and polishing machine generally must be mechanically sound and true running.

* * *

(f) **CRACKS.** If a die shows small incipient cracks, visible in the bore, it may be worth while to open up to a larger size to determine whether these cracks will "polish out". If after such treatment they enlarge rather than disappear, it is unlikely that the die will withstand the stresses of wire-drawing.

* * *

INCIPIENT cracks around the die entrance (i.e. not in the reduction angle or the bearing) do not as a rule prevent its further use.

* * *

TO ensure that any of the above-mentioned treatments have been effectively carried out, a suitable opportunity should be taken before the die is returned to stock or to service, to draw wire through it under normal operating conditions.

* * *

7. Record of Die Performance

THE full advantage will not be obtained from the installation of a die maintenance procedure unless some record of die performance is maintained. By recording the amount of material drawn through the die, the operator, the wire-drawing machine used and the reason for the withdrawal of the die from service (including the degree of enlargement), data will be accumulated without which it is impossible to determine the relative importance of faults in wire-drawing practice and differences in die quality.

TO WIRE MILL MEN

The Wire Association is for the specific purpose of improving production methods. It has been organized as a clearing house of ideas on technical problems and research work in all phases of practical wire drawing and wire working.

The inquiries discussed were received from and answered by members of the Wire Association. These inquiries are sent to the Secretary of the Association who acts as a central clearing point, and neither the names of the firms, nor individuals sending the inquiry, nor of the men or firms replying are divulged without permission.

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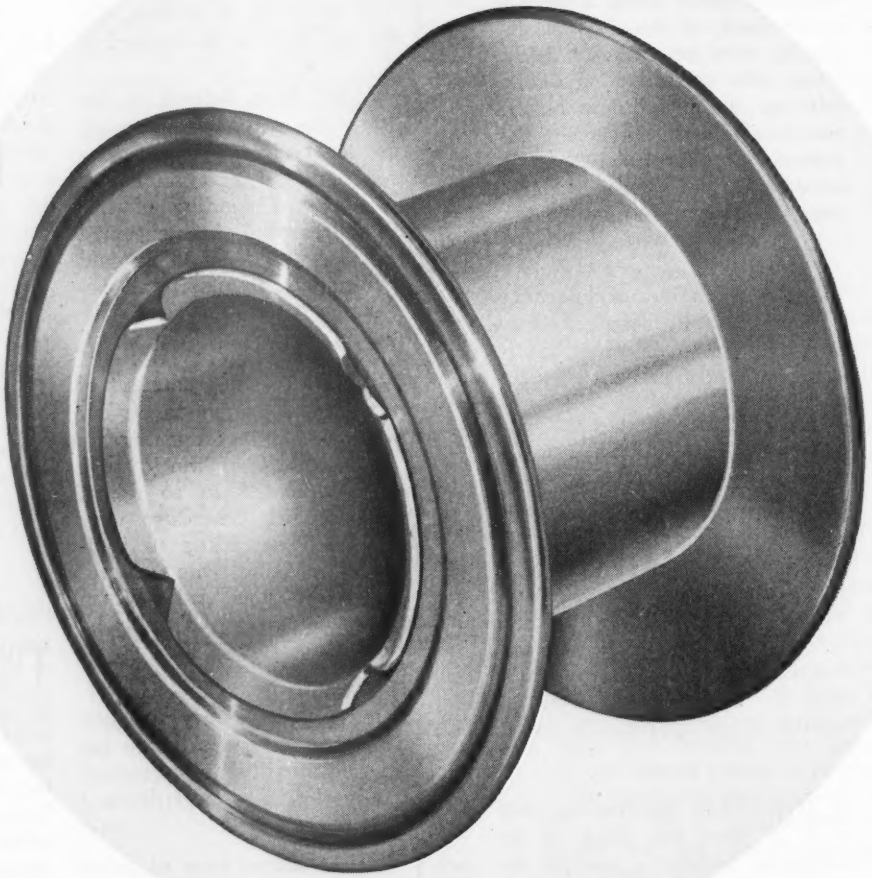

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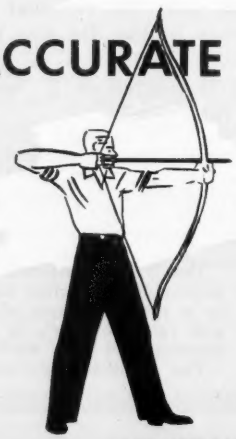

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THE SPOOL FOR PRECISION WIRE PACKAGING

ACROPAK means greater precision! Concentricity, true flanges, dynamic balance and closely toleranced traverse assure perfect packaging. ACROPAK provides even drawing tension and eliminates traverse adjustments which, in turn, cuts costs, and assures minimum wire breakage both in packaging and in take-off.

SIZES AVAILABLE FROM STOCK		
Flange Diam.	6"	4½"
Barrel Diam.	3½"	2½"
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Arbor Size	⅛" to 3"	⅜"

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LONG LIFE

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LABOR RELATIONS

by John B. Stone,
Washington, D. C.

The tenth in a series of articles on the subject, with particular reference to problems of the wire and wire products industry. The author is a noted authority on the subject.

DESPITE the daily evidence in newspapers that the courts are prepared to uphold practically all the provisions of the Taft-Hartley law, the decision of the basic labor issues involved has by no means been made.

* * *

OF particular interest to manufacturers of wire and wire products is the forecast by the best-informed impartial labor experts in the nation's capital that radio manufacturing and steel fabrication will probably be two of the chief battle fields upon which the issue is finally settled.

* * *

ONE obvious element in the current situation leading to this prediction is the fact that the United Electrical, Radio and Machine Workers of America, left-wing Congress of Industrial Unions affiliate with 600,000 members and another CIO giant, the United Steel Workers of America, nearly 1,000,000 strong under the personal leadership of Philip Murray have both taken uncompromising stands against the controversial law and both, so far at least, give evidence of backing up their stands by direct action on the picket lines if necessary.

* * *

BUT the more far-reaching reason for selecting steel and radio manufacturing as two fields of action is an ideological one. In this case the ideological facts of union policy stand to affect actual plant operations of wire and wire products manufacturers in a very real way.

* * *

FOR it is readily predicted here that if the Supreme Court of the United States upholds the constitutionality of the disputed portions of the Taft-Hartley law, Murray and his steel workers will probably bow to the court and knuckle under.

THEY doubtless would continue their fight politically to get the law repealed by Congress but spokesmen close to Murray believe that he would not tolerate strike action against the law after a Supreme Court ruling against him.

* * *

ON the other hand it is just as freely predicted that the United Electrical, Radio and Machine Workers, with their militant left wing leadership would attempt to bypass the law, if its "objectionable" provisions are held constitutional. It is believed they would not strike directly against a court decision but would attempt to carry on their negotiations with employers outside provisions of the law.

* * *

THIS might well mean a situation similar to the newspaper strikes of the International Typographical Union in Chicago and elsewhere, except that in radio and steel the situation would be vastly more complicated and more susceptible to prolonged and violent labor trouble.

* * *

IF any such developments occur, it is regarded here by reliable sources, that the final break between the United Electrical Workers and the CIO would be hastened.

* * *

SINCE Murray's leadership in the last two years has moved more and more to the right and his pronouncements against Communists and Communist dominated unions, the UE leaders have become more and more restless. Since the drive to wrest the union from left wing leadership has failed, the right wing CIO forces are becoming more antagonistic to UE leadership. This has led to actual severing of relations between UE and the New Jersey CIO state organization.

* * *

THIS breech is likely to be widened at national parleys in the near future at which the CIO must take on what action to follow in the presidential candidacy of Henry A. Wallace. Left wing CIO unions are strong for Wallace. The right wing is strong against a third party. Murray is expected to stick with Truman, thus widening the break with UE.

* * *

ADD to this tense situation, a break over policy against the Taft-Hartley Act, and you have the makings of a secession movement.

* * *

STRANGELY enough, if it comes, John L. Lewis, head of the United Mine Workers which recently withdrew for the second time from the AF of L, would doubtless turn up on the side of the left wing UE. He has been as outspoken against Communists as Murray, but in the past he has used them to build his labor organizations and doubtless would do so again, particularly if by so doing he would weaken his old friend and present number one enemy, Murray.

* * *

WITH the Mine Worker's District Fifty leading the campaign, a nation-wide drive to disregard the Taft-Hartley law regardless of its constitutionality, could form the opening wedge in a plan to pry the Steel Workers away from Murray and the Auto Workers away from Walter Reuther who has been particularly mild in his criticism of the Taft-Hartley law.

(*Please turn to page* 173)

Grand Crossing Tack Co.

INTERSTATE IRON & STEEL CO.
REPUBLIC STEEL CORP.

By Kenneth B. Lewis
Consulting Wire Mill Engr.
Worcester, Mass.

An outline and history of the development of Republic Steel Corp. The seventh of a series of articles on the history of American Wire Mills.

GRAND Crossing, Illinois, was not merely suburban, it was definitely rural when, in the late seventies of the last century the **Hutchinson brothers, E. W.,** and **O. N.,** tack makers from Fairhaven, Mass., put up a wooden building on the prairie, installed six machines of their own make, and were in the tack business. Within a few years the number of machines had grown to 122, of which 22 were from Perkins of Bridgewater, and the rest home-made, and the plant was the only one west of New England that carried every size and style of tack.

* * *

IN 1884 the plant burned down; most of the machines were salvaged, and were soon back at work in a three-story brick building. Just how, when and why this little enterprise blossomed into a general wire mill I do not know, but it must have been in the late eighties, and the equipment came from Worcester, either from the **Morgan Spring Co.,** or from the **Morgan Construction Co.,** which was just then beginning to take separate form. There were wire benches, a galvanizer, and some nail and barb fence machines, most of which were built on the spot. By 1892 the company was a definite factor in the common products market. Another fire in 1899 stopped them briefly. All the fabricating machines on the upper floors fell through to the basement and the walls came in on top of them. But a good part of the stuff was again salvaged, and in 1900 they were at it again.

* * *

1901 was, as in so many cases, a year of decision for the **Hutchinsons.** It was a case of fall down and worship the golden image of **John W. Gates,** or into the fiery furnace with them; or, interpreted, no more rods. The boys were stiff-necked; they went through the fiery furnace, and came out with a **Morgan** continuous rod mill. This was, I suspect, the smallest target a **Morgan** mill ever had to shoot at; as I recall it, the tonnage desired was at most, eighty tons a day. Well, **Morgan** made it a single strand mill, thus cutting the normal output in two, then they cut it again by working only single shift, and with easy hours and plenty of days off they figured they could hold it down to a figure which the wire mill could stretch out and meet.

* * *

HERE there arose an unforseen factor. Many of the independents had bowed down before the golden image, but many more had turned out rugged individualists, and the demand for wire rods was staggering. The price rose to fantastic heights; the little **Grand Crossing** single strand mill ran day and night, paid for itself in jig time, and for a while yielded the delighted owners a net profit of $1500. a day! Brother Octavius, **"Tavy"** to his intimates, had a keen sense of humor and an ear for music. He composed a song which he delighted to sing at small intimate gatherings to his own guitar accompaniment—one of those songs with a thousand-odd verses and a chorus that always started "Fifteen hundred dollars a day."

* * *

WHEN I first prowled through the plant in 1912 looking for this little mill, I almost missed it. It was tucked away in a space that seemed no bigger than a couple of bowling alleys. There were only two reels, close up, no rod conveyor or hook carrier. Rods were hooked off onto trucks and wheeled out onto the sidewalk. By this time the

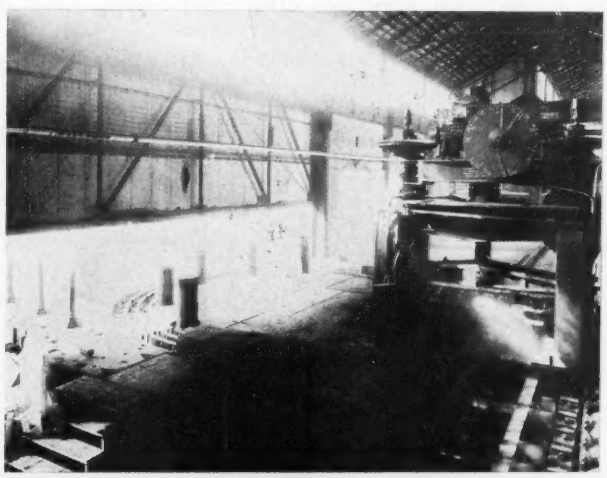


Fig. 1. — Reversing Blooming Mill.

* * *

city of Chicago had flowed out around the mill; **Grand Crossing** was merely the place where South Chicago Avenue was crossed by 79th Street. There was no room for rod storage in any accepted form, but there was a twelve foot parkway around the plant, just a space between the building wall and the sidewalk, and in this space, all around the mill, the rods were manhandled onto piles. They were reloaded for the cleaning house by the same gang. Twelve men were constantly employed on this job. Unloading, handling, and charging billets was also a hand job.

* * *

THIS was a fourteen stand mill, involving rather heavier drafts than good practice now permits, but in those days everything was being sacrificed to tonnage, and as a matter of fact there was by no means a clear understanding of the importance of a decent rod section in the soft grades of steel. It took the advent of alloys to really show up careless rod rolling. Still, with all its weaknesses, that was a mill that was capable of knocking out a remarkable rod, if properly handled. About twenty years ago **Morgans** ran a contest for rod rollers of **Morgan** mills, with a hundred dollar prize for the best three bundles. I was foolish enough to submit some ideas as to how rod quality should be assessed, looking at the matter from the wire man's angle, and was naturally saddled with the job of organizing the inspection. First prize went to one of the newer mills with two free loops, but in second place, and so close a second that we wavered a bit, was this little old fourteen stand **Grand Crossing** Mill. I think **Emil Hall** was in charge of the rod mill at that time; he had succeeded **Bill Powney**, the original roller.

* * *

BY 1903 the wire mill had risen to 4000 tons a month, and the rod mill was knocking out a steady 5000. But now came Satan again, with the same old cry, bow ye down to the golden image or into the fiery furnace with you; this time it was billets. Back to **Morgan** came the **Hutchinson brothers** to get a steel plant. On a piece of land at 118th St. and Burley Avenue, now a familiar spot to wire men, they set up a couple of open hearth furnaces and a blooming and billet mill of the most amazingly ingenious design. The problem was a genuine stinker. There was needed perhaps a tenth of the normal output of a blooming mill, and say a fifth of the output of a billet mill, and a billet whose finished length at 1¾" square was about a city block. The solution is shown in the accompanying photo, Fig. 1. There is a reversing blooming mill which works an ingot down to a certain size and then transforms itself into a continuous billet mill of the looping type, if you can conceive of such a thing. The engine stops reversing, and runs constantly in one direction; the billet is knocked down into a flat oval, of the proportions of the ovals in rod practice, and comes out through a twist guide. It finds itself in a repeater and makes a 360 degree turn around the housing, entering the next pass on edge to be smacked into a diamond. The diamond makes the circuit, is mashed to an oval, and so it goes, around and around in a perfectly insane manner, finally emerging at a tangent at 1¾" square and running off in an angle-iron trough to be sheared to 30 foot lengths.

* * *

I had seen drawings and photos of this bizarre contraption before I ever went to 118th Street, but my attitude was more or less that of the farmer toward the giraffe. I stood and watched the thing for several hours before I began to believe it. With all the trouble I had seen with ovals in rod mill repeaters I couldn't realize that they could go 360 degrees day after day with never a sign of faltering. When I saw it happen I realized that the great size of the oval relative to the diameter of the circle in which it traveled gave it marvelous stability.

* * *

THERE was another remarkable thing about this mill. It is said to have been the first in which the fingers that turn the billet were attached to and traveled with the side guides. This feature became common practice almost overnight. This combination mill filled a special need that is unlikely to often recur. The only other example, and the only mill of the type now running, is at **Keystone Steel & Wire Co.**, at Peoria. The mill at 118th street was rebuilt in 1926; the repeater was discontinued and a 21" billet mill installed.

* * *

THE next significant date in Grand Crossing history is 1916. The **Interstate Iron & Steel Co.**, was operating in East Chicago and got into a jam. They had planned a couple more open-hearth furnaces and further finishing capacity when the city council decided to extend a public street which cut through the projected improvements and stymied the plant completely. The company officials looked around, and bought out the **Hutchinsons** in order to get hold of the 118th

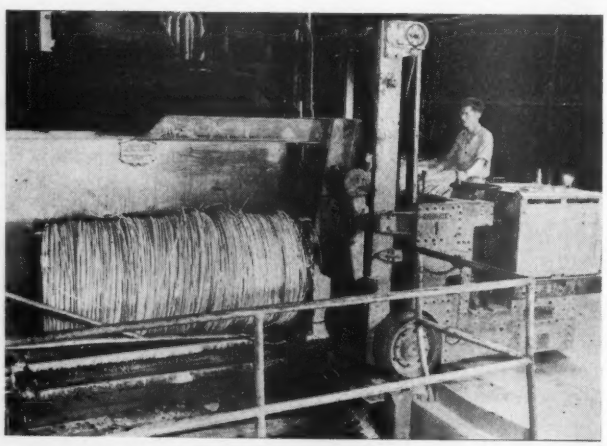


Fig. 2. — Handling Wire Rods. — Republic

* *

Street property. There they made the projected extensions, but they found themselves in the wire business at 79th St., a thing they had not looked forward to with any enthusiasm. They went to the **American Steel & Wire Co.** for **Walter Stone**, an old timer of wide acquaintance, a founder of the Wire Association, one time superintendent at Waukegan, and assistant manager of the Chicago District. They could hardly have picked a better man. **Dick Vail**, who had been superintendent up to that time, left and founded the **Vail Manufacturing Co.**, which his sons have carried on since his death.

* * *

WALTER brought some key men with him, as is customary in these cases. **Emil Hall** superseded **Bill Powney** at the rod mill, **E. E. Kilmer** replaced **Joe Hack** as master mechanic, and worked out a host of safety devices and labor saving gadgets all over the mill, including some of the early strippers and a system of feeding tack machines from coiled strip. I think it was **George Cudahy** whom **Walter** brought in as his assistant. He left about 1920 to go to **Macwhyte** and was succeeded by **Hiram Mills**, from the Corporation. In 1929 **Art Yort** became the assistant. Art was an Interstate man who started at East Chicago, went to South Chicago, then to the city office, and then to Grand Crossing. He came up through clerical channels, not through the wire mill.

* * *

UNDER **Walter Stone** a program of modernization was put into effect, which started with motorization and gradually swung into a shift toward manufacturers' wire. The **Interstate** folks were alloy-conscious, and in 1924 the decision was made to withdraw from the farm products field. Benches were slowed down and stiffened up, and the words chrome and vanadium began to be bandied about. Welding rods and special finishes were frequent topics of argument. Some time along in this period my friend **Charley Drinkwine** dropped out of sight; I don't know where he went, or why, but I had a vague feeling that the new products brought problems that disgusted him, and he probably went looking for some honest nail and fence mill. He was a loyal and hard working foreman and had a lot of friends.

* * *

WALTER **Stone** was an early convert to carbide dies; he started with them in 1928 and in 1930 sent all the iron dies to the open-hearth. In 1930 his program was vastly helped by the installation of a new mill at the South Chicago plant. It was a **Morgan** rod and merchant bar mill of distinctly advanced type, figured to roll the finest section obtainable in small merchant bars, and to roll such rods as had never been rolled before. The old **Grand Crossing** rod mill shut down at this time, and in the same year **Interstate** became a part of **Republic Steel Corp.**

* * *

THE first effect of the new connection at **Grand Crossing** was the installation of patenting furnaces and an entrance into the spring wire market. The drift toward specialty wires which had started under **Interstate** became more pronounced, and metallurgical and sales personnel were carefully selected as they became available. In 1932 **Walter Stone**, who had been fighting ill health for several years, wore out, and left a big hole in the ranks of top flight wire men. **Art Yort** succeeded him at **Grand Crossing.**

* * *

IN 1935 the heads of Republic decided to build a common products wire mill at the steel plant in South Chicago. While the planning was a joint effort of management all down the line, it was **Yort** who was on the firing line in this new project. He was its superintendent when it started, in fact he was in charge of both mills, assisted by **John Burns** and **J. P. Frestel**, one at each plant. **Burns** succeeded **Yort**, but left in 1942. At present **Frestel** is in charge, assisted by **C. W. Dudding.** The new mill has been adequately described in the technical press, but I will run over some of its features, because they are new and deserve the courtesy of criticism.

* * *

THE rod storage is under a bridge crane with controlled hairpin hook, with 6-high piling of bundles on edge. A broadside transfer under the crane enters through the side wall of the cleaning house with 3600 lb. loads, and is under push-button control by the craneman inside.

* * *

THE cleaning house is not straight-line, but rectangular, with sunken tube and a bridge crane with three motions. Baking was carefully planned. This was just before the flash baker became available. The baker, by **Drying Systems, Inc.**, forms a passage between the cleaning house and the mill. It has a floor-level broadside transfer with "horns" to support 3600 lb. lifts of rods set on it by the crane.

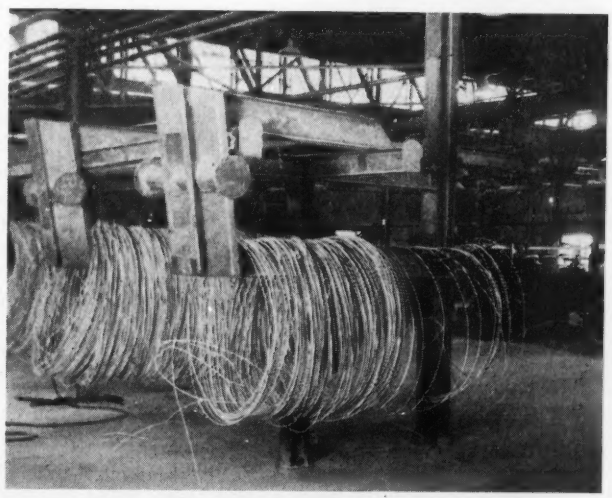


Fig. 3. — Handling Wire Rods. — Republic

* *

The lift doors at both ends are synchronized with the transfer through push-buton control, so that each addition of a pin of rods results in the discharge of a finished pin in the wire room.

* * *

BUT the neatest thing about the whole scheme is the way the truck picks the pin of rods off the mill end of the transfer. It has a demountable ram in the shape of a steel hairpin hook, of which there are fifteen or twenty. The truck spears the bundle of baked rod, carries it to the wire machines, and sets it down on a couple of steel beams which run the length of the row of machines. These beams engage the upper member of the hairpin, and from the lower member the rods, suspended about six inches from the floor, are flipped to the dies. It is a very effective system and meets a variety of conditions. The back member of the hairpin is provided with a sort of stud like a collar-button, which is engaged by the vertically sliding fork member of the truck.

* * *

I am interested in establishing the beginnings of all wire mill practices, and never lose a chance to record my recollections, however faulty they may be. Here is my story of flipping from suspended hooks.

* * *

IN 1928 I was laying out the **Sheffield** wire mill at Kansas City. There was to be **Cleveland Tramrail** rod storage and a **Cleveland** gantry in the cleaning house—the second such installation, I believe. Constantly exposed to the influence of a group of tramrail-minded salesmen and engineers, and already despising wire mill trucks, it was natural that I should hit upon the notion of running all the rods around on suspended hooks. I planned first to park the hooks adjacent to the machines, pull each bundle off, and slip it onto an orthodox flipper. But just at that time I saw, at **North Works** in Worcester, rods being flipped off a wire truck, and I shifted my plans to include a drop-section in the rail to set a hook of rods onto the floor behind each machine, the rods then to be flipped off the hook.

* * *

CLEVELAND Crane & Engineering supplied rail and hook, I set up a wire machine, and started experiments with attachments to facilitate the flipping. **Paul Morgan** walked through the shop and saw the experiment. He asked me why I lowered the hook to let the rods touch the floor, and I replied that rods would not flip unless they touched the floor. **Mr. Morgan** said "Are you sure of that?" After a moment of horrified silence I replied "no, I'm afraid I was just the victim of inertia; rods have never been flipped from a suspended position, so I assumed they never would be, but wait a minute and we'll try it." I hoisted the track section up till the rods swung clear, and they flipped better than they had from the floor. I have a patent on the thing, for what it is worth.

* * *

AFTER **Sheffield** got started a complication arose. **Frank Nullmeyer** at **Y.S.&T.** had been experimenting and had applied for patents on means for flipping rods off a truck. After he saw the **Sheffield** job he recalled his application and had it re-written to cover the **Sheffield** construction, at least that's what his lawyers claimed. **Sheffield** paid a nominal fee to quiet his claim. I never heard of any other protest; it was a long time before the **Sheffield** layout was extensively copied, and all the patents must have long since expired.

* * *

THE wire drawing equipment at 118th St. is all **Vaughn,** double deckers, and three and five holers with the first block double-decked. The rods are welded on the flipper hooks, and as there is room for two side by side, there is no reason for dies to run empty until they require polishing. On a visit to the mill a few years ago I found a scale of tonnage rates in effect which recognized the basic realities of continuous drawing as they had never been recognized before. I use the word "scale" loosely; there was no scale, simply a rate, which applied equally to every size. It was a frank acknowledgement of the fact that wiredrawing is merely a handling problem, that there are a certain number of chores to be done, welding, stripping, bundling, and loading, and that these must be done to a certain number of bundles regardless of the number of drafts to be performed. Adjustment of finishing speeds and number of machines per man is all that is required to equalize the earnings. This was a great satisfaction to me. I had predicted it in 1922, when I was bringing out the **Morgan-Connor** machine. I have usually been thirty years ahead of reality; now it looks as though the human race is catching up with me.

* * *

THE details and accessories are such as have come to be standard, motor driven pointers, rigid arm stripping cranes, collapsing strippers, but the speeds and horsepowers are pertinent. Double-deckers, 45 HP, 287-861 fpm; three-holers, 90 HP, 850-1250 fpm, five-holers, 112.5 HP, 1000-1400 fpm. Water-cooled carbide dies are used, and the product is loaded on truck bodies welded to steel skids for lift-truck transportation.

* * *

THE only novelty in the nail mill is the driving of the machines from a lineshaft in a tunnel, and the absence of overhead belts is very pleasing. It is said to allow closer spacing and better inspection. Bale tie and fence equipment are standard in design and layout. Barb wire machines, **Emery** and **Bates,** came from the old mill. Nail machines are chiefly **Glader,** and field fence **Interlocking.**

* * *

THE galvanizing plant is electrolytic, of the **Meaker** system. It is a 40 strand unit, with a run of about 500 feet. Annealing is in lead, beyond which there are 70 feet of cleaning units comprising a hot alkaline bath, a rinse, a pickle in acid, another rinse, a series of three electrolytic flash cleaners, and a final rinse. The plating tank is 140 feet long, six feet wide and

(*Please turn to page* 181)

GOVERNMENT WIRE PRODUCTION INFORMATION

Government Report on Hair Spring Manufacture Available

RUNNING hairspring wire between graphite-coated pads to reduce wear on fabricating equipment and increase output is one of several novel methods described in a report on the German watch, clock, time fuze, and jewel bearing industry now on sale by the Office of Technical Services, Department of Commerce. The report, prepared by OTS investigator James G. Shennan, is based on visits to six factories in Southwestern Germany.

* * *

THE graphiting method was used at the Karl Haas company in Schramberg. The spring wire was run through powdered graphite after final cleaning in the round and again before the first pass through the rolling mill. The wire was also run through in the flat before coiling. The procedure was believed to reduce the wear on rolls and also reduce production losses due to springs sticking together after heat treatment.

* * *

AT one of the factories making jewel bearings, the investigator noted an unusual machine for charging diamond powder into flat laps. A tapered charging roller was used so that there would be no sliding action between the charger and the lap. It was of extremely heavy construction. The small diameter of the charging wheel was the same as the inner diameter of the lap, the outer diameters also being equal.

* * *

THE investigator found the plants well-equipped with Swiss or Swiss-type machinery. During the war many of the plants made springs and precision parts for anti-aircraft time fuzes. Some have resumed making of watches.

THE report contains general economic information about the firms visited, including retail prices and wages paid employees. An appendix contains drawings of a wire rolling machine designed, built and used by the Karl Haas firm.

* * *

MIMEOGRAPHED copies of the report (PB-1272; **Watch, clock, time fuze, and jewel bearing industry in Southwestern Germany;** 35 pages, drawings) sell for $1.25. Orders for the report should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

Tungsten

GERMAN development of a tungsten-free cast hard metal for tooling purposes is described in a British Intelligence Objectives

TRADE MARK REG. U. S. PAT. OFF. MICRO-WELD MICROMETER PRECISION

MODEL M-T, FOR BENCH MOUNTING

This welder was designed and developed expressly for welding all types of fine wire: Aluminum, Copper, Brass, Bronze, Steel and Steel Alloys, ranging in size from .005" to .020" diameter.

Unit design of frame, transformer and power sub-assemblies permit other range of sizes to suit requirements.

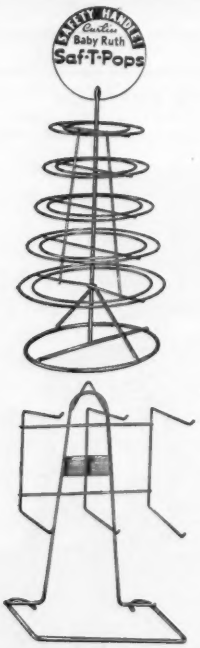
Equipped with a temperature indicating annealing and tempering device, voltage regulator and meter to compensate for voltage fluctuation, wire cutters, extra large 5" diameter magnifying glass, fluorescent light and extension cord. Welder can be supplied for bench mounting, or mounted on 4-wheel truck.

The adaptability of this unit for welding all types of wire, either ferrous or non-ferrous, in sizes from .005" to .020" diameter, makes it ideal for the fine wire manufacturer.

MICRO PRODUCTS COMPANY
20 NORTH WACKER DRIVE
CHICAGO 6, ILL.
Telephone: State 7468

FASTER SERVICE more sales

KERR wire display racks*
made with
KEYSTONE WIRE



Successful merchandising depends on displaying products to the best advantage.

Display racks by Kerr Wire Products Corporation are designed for self-service. They stimulate faster buying . . . invite repeat sales . . . and no space is lost or used inefficiently.

Into Kerr racks goes dependable Keystone wire, with proper ductility for easy forming . . . clean bright surface for spot welding and plating. For these important reasons Keystone wire has been chosen to supply the proper foundation to the quality of Kerr wire products.

*Kerr Wire Products Co., Chicago, Ill.

KEYSTONE
MUSIC SPRING WIRE

SPECIAL ANALYSIS WIRE
for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

Sub-Committee report now on sale by the Office of Technical Services, Department of Commerce.

* * *

THE development took place at the Roechling Buderus firm in Berlin, the major producer of cast hard metal in Germany. The report is based on an interrogation of the assistant director of the firm.

* * *

IN the first tests to develop tungsten free hard metal, vanadium and titanium were used with iron as a binder. The results were so good that no other metals were tested. Assuming that it would be impossible to equal the performance of tungsten carbide, the firm at first hoped to develop a product with a cutting performance somewhere between that of the stellites and hard metal, the report states.

* * *

TITANIUM and vanadium carbide were made by carburising the oxide or the sesquioxide in a hydrogen atmosphere. The product obtained was ball milled, sifted through a 1,000 mesh sieve, then ball milled with iron powder and sieved. The powder was then compressed and sintered.

* * *

EARLY samples produced surprising results. None of the samples possessed sufficient strength to stand up to cuts of more than 1.2 square millimeters cross section but a few individual samples withstood cutting speeds above those of tungsten carbide hard metals without cratering, according to the report.

* * *

AT the end of the war the tungsten free hard metal was still variable in quality, the assistant director told the British investigators. He said lack of uniformity in the metal was due to the presence of oxides in the titanium carbide and claimed that this difficulty had been overcome. He thought sufficient work had been done to prove that a very promising tungsten-free hard metal had been produced and that it would equal the performance of the more orthodox hard metals for machining steel, non-ferrous, and plastics.

* * *

THE report gives an analysis of the composition of the tungsten

free products, describes problems encountered and improvements made in the process and contains a translation of test reports on tungsten-free hard metal tools for rough turning, finishing, parting off forged shell bodies, tip soldering, and grinding.

* * *

THE report also describes the production and use of cast carbide in Germany and includes drawings of furnaces and equipment. The main uses of cast hard metal in Germany, the report states, are for shaping and cutting tools, abrasive resistance parts, and boring in the mining industry. Cast tungsten carbide powder is used to dilute grinding and polishing pastes.

* * *

Japanese Magnetic Materials

FOUR magnetic materials not made in the United States are made by the Japanese according to a report now on sale by the Office of Technical Services. The report, prepared by investigators for the U. S. Naval Technical Mission to Japan, surveys the development of magnetic materials in Japan during the war. The subject is of particular interest in connection with the development of magnetic amplifiers, the report states.

* * *

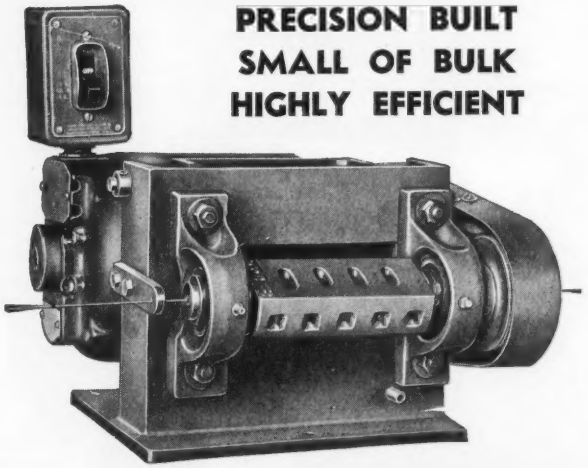
THE four materials are: an iron-aluminum alloy "Alfer", developed as a substitute for nickel; "Sendust", a high permeability alloy of iron, silicon and aluminum; and two permanent magnet materials, "NKS" and "OP", developed before the war. About 16 other magnetic materials are made in Japan including a few of the high-nickel, high permeability alloys used in quantity in the United States. None of the American magnet material, "Alnico V", is made in Japan, according to the investigators.

* * *

ONE important new application of magnetic materials in Japan has been the use of Alfer in magnetostriction projectors and microphones. It was also used to replace nickel in the cores of underground vibrators and receivers. The NKS permanent magnet alloy and the high permeability Sendust are

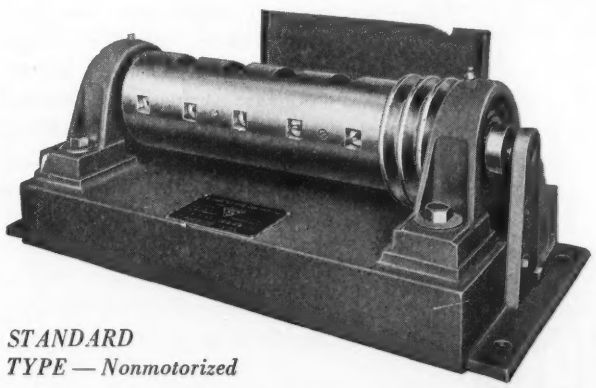
New Completely Motorized ROTARY STRAIGHTENER

PRECISION BUILT
SMALL OF BULK
HIGHLY EFFICIENT



FULLY and accurately motorized. Very compact, and so free from vibration it can be operated on the bench without being bolted down. The speed is high, and is predetermined for the wire to be handled; yet operator can easily vary the speed by merely altering the motor sheave. Comes complete with switch—nothing to do but connect it into the power line. Make a happy ending to heavy, bulky, inefficient motorizing!

As always, a similar straightener (see below) is available without motor.



STANDARD TYPE — Nonmotorized

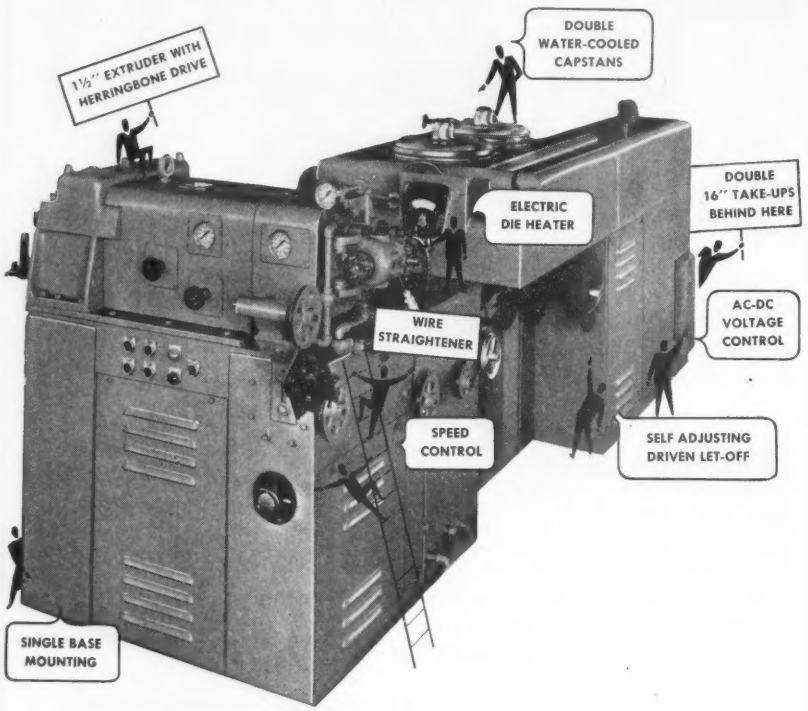
THE F. B. SHUSTER MFG. CO., INC., NEW HAVEN, CONN.
3102 MILL RIVER STREET

SHUSTER SINCE 1866

Automatic WIRE STRAIGHTENING AND CUTTING MACHINES

Anyway you look at it...

This 1½" (NRM) Wire Covering Unit Sparkles With Features



SPACE here is too limited to completely describe the unit above. But you can see for yourself... its clean, compact design... only 13 feet long. What you can't see is its versatility... its great performance on smaller diameters of wire at speeds up to 800 feet a minute. If you want to add a great little unit to your wire covering capacity, you'll need more information of course... just drop us a line, today.

NRM

Plastics Machinery Division

NATIONAL RUBBER MACHINERY COMPANY

AKRON 8, OHIO

used in various kinds of apparatus in conventional ways, the report states. OP magnets are used in magnetic chucks, ore separators, telephone receivers, loud speakers for air planes, bicycle lamp generators, and the like.

* * *

RESEARCH in general was influenced by Japan's lack of nickel and cobalt. In the manufacture of magnetic materials Japanese methods are said by the investigators to be about 10 years behind those of the United States. For example, silicon-iron transformer sheet is never processed by cold rolling.

* * *

HOWEVER, it is believed that the development of new Japanese magnetic materials may be of interest in connection with American research on the magnetic amplifier or transductor which requires high permeability magnetic core materials for efficient operation.

* * *

WHILE some work was done on the magnetic amplifier in Japan during the war, the report explains, no magnetic amplifiers were used by the Japanese navy and negotiations with Germany to obtain samples and information about them apparently never materialized.

* * *

EXPERIMENTAL work was carried out to determine if magnetic amplifiers could be used in place of a three stage vacuum tube amplifer and as relays for automatic telephone circuits but no practical application was made. Reports of these experiments are contained in the report with illustrations and circuit diagrams.

* * *

THE report, in three parts, discusses research, manufacture, and use of magnetic materials in Japan. The section on research describes fundamental physical studies, the investigation of four alloy systems (Fe-Al, Fe-Ni-Si, Fe-Ni-Cu-Cr, Fe-Me-W), and experimental engineering applications. The section on manufacture discusses composition and production methods of the permanent magnet materials KS, New KS, MK alloys, OP magnets, molybdenum magnet alloy, Senal-

loy; and of the core materials, Alfer, Alperm, B.S. alloy, 30 percent nickel alloy, superpermalloy, NC alloy, Japanese nicalloy, Sendust, magnetic oxide loading-coil cores, N. F. alloy, TMS, electrolytic iron, silicon-steel, Senperm, and Furukawa magnetic alloy. The section on use discusses magnetic amplifiers and the use of Alfer in underground vibrators and receivers.

* * *

APPENDICES to the report include a list of titles of Japanese research projects carried out since January 1941, translations of Japanese papers on the magnetic amplfier, production figures on magnetic alloy steels 1940-1944, and remarks on high-purity silicon steel specimens.

* * *

Southern Machinery and Metals Exposition To Be Held in Atlanta

THE Third Southern Machinery and Metals Exposition will be held in the Atlanta Municipal Auditorium, April 5, 6, 7 and 8, 1948.

* * *

MANUFACTURERS of machinery and tools; metal products; materials handling equipment; oils and lubricants; welding and safety equipment; ferrous and nonferrous castings and forgings; electronic apparatus; chemicals and detergents will exhibit their products. Lathes, saws, presses, drills and a variety of industrial equipment used in Southern plants will also be shown. The steel industry will be represented with outstanding exhibits by some of the leading companies.

* * *

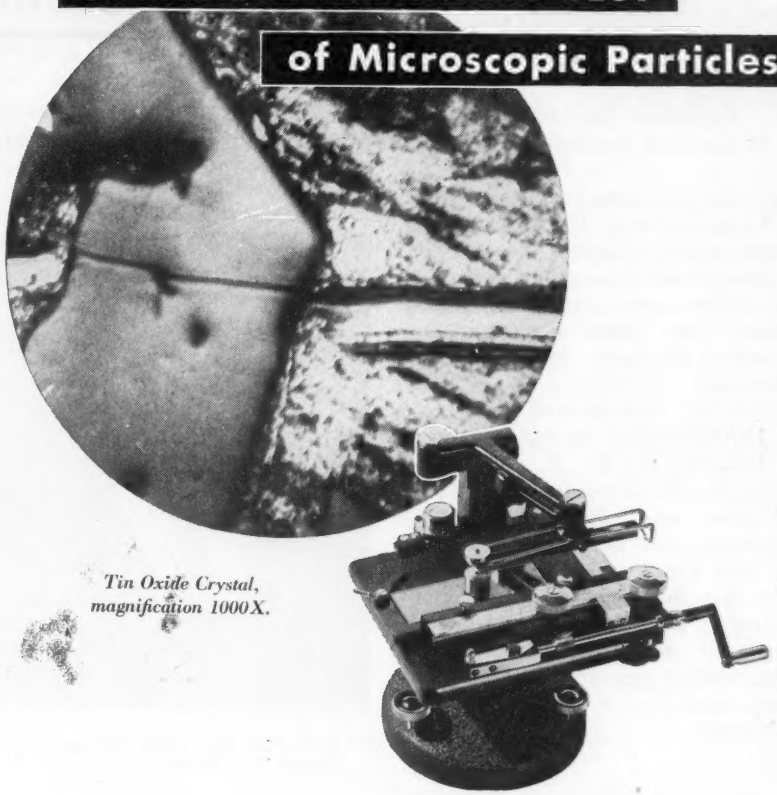
HEADQUARTERS of the Exposition are at 267 E Paces Rd., N. E., Atlanta, Ga.

* * *

New General Tool Catalog Available from Carboloy Co.

A completely new 65-page general tool and carbide parts catalog (Catalog GT-200)—showing its standard cemented carbide products, with specifications and prices—has been issued by and is available from **Carboloy Company, Inc.,** Detroit, Michigan. The catalog supersedes the Company's former Catalog 175R and its various supplements.

A PRECISE HARDNESS TEST of Microscopic Particles



Tin Oxide Crystal, magnification 1000X.

WITH a Spencer Bierbaum Microcharacter you can measure accurately the hardness of small areas, particles, and microscopic constituents of metals.

The specimen, highly polished and lubricated, is moved by micrometer feed beneath an accurately ground diamond point. The point is cube shaped for durability and ease of duplication. Pressure is precisely controlled so that hardness can be determined under the microscope by measuring the width of the resulting cut.

The Microcharacter is recommended for use with Spencer Metallurgical Microscopes. For further information write Dept. B160.

American Optical
COMPANY
Scientific Instrument Division
Buffalo 15, New York

Manufacturers of the **SPENCER** *Scientific Instruments*

Outstanding Personalities of the Wire Industry

Carboloy Expands and Streamlines Marketing Set-Up

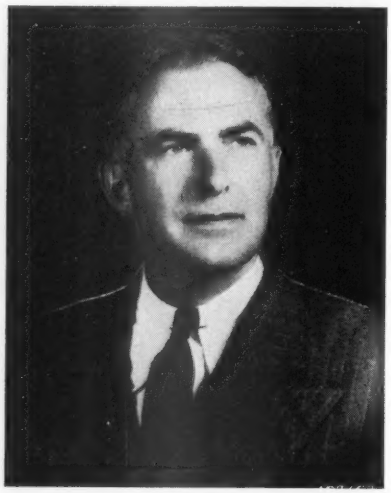
A far reaching expansion and streamlining of its marketing organization, designed to provide increased and more effective service to carbide users all over the United States, has been announced by **Carboloy Company, Inc.**, Detroit 32, Michigan.

* * *

HEADING the marketing organization is **K. R. Beardslee**, formerly Vice-President in Charge of Sales, who now becomes Vice-President and Marketing Manager. In this capacity he is responsible for all activities affecting the marketing of Carboloy products including sales, merchandising, advertising, market research, sales promotion, customer services, and sales education.

* * *

UNDER the new set-up, all sales will be directed by **J. E. Weldy**, who has been named Sales Manager,



K. R. Beardslee, V.-P. and Marketing Manager of Carboloy Co. * * *

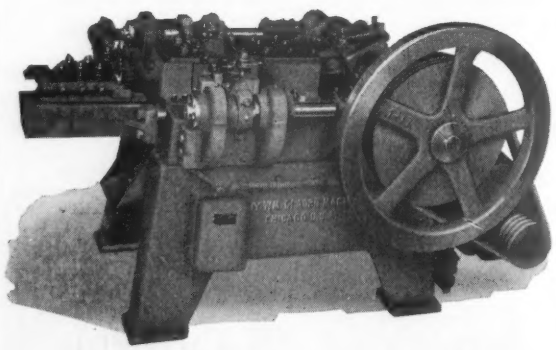
while all merchandising activities will be directed by E. C. Howell, who has been appointed Merchandising Manager. Merchandising functions in the announced plan also include advertising and sales promotion. Mr. Weldy was formerly Manager of Distributor Sales while Mr. Howell was formerly Advertising Manager.

* * *

THE present sales engineering and sales services on the four major lines of Carboloy products are now coordinated under the Sales Manager as follows:

CUTTING TOOLS:
Harry Crump, Manager of Cutting Tool Sales-Engineering.
WEAR PARTS:
J. S. Gillespie, in Charge of Wear Parts Sales-Engineering.
DIES:
Earle A. E. Glen, Manager of Die Sales,
SPECIAL PRODUCTS (including mining applications and those Carboloy

GLADER HIGH SPEED WIRE NAIL MACHINE



MACHINE ARRANGED FOR INDIVIDUAL MOTOR DRIVE

High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS
210 No. Racine Ave.
Chicago 7, Illinois
Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

products having diamond content, such as wheel dressers, core bits, etc.):
A. F. Dobbrodt, Special Products Sales Engineer.

* * *

THE new marketing set-up further provides for two additional groups of services. Market research, budgeting, and sales order handling are under the direction of **G. M. Chandler,** Business Services Manager. Training activities, including both educational programs for customers and sales organization training, will be directed by **J. M. Bertotti,** Manager of Training and formerly Director of Sales Training.

* * *

THE new set-up is expected to further improve and expedite contacts with customers—both directly — while insuring maximum coordination of all sales and merchandising activities and planning as a key to improved marketing.

* * *

American Steel and Wire Appointments

TWO appointments in the headquarters sales department of American Steel & Wire Co., United States Steel Corp. subsidiary, have been announced.

* * *

CHARLES W. Meyers, who started work in the company's Cuyahoga Works as a chemist in 1923, was named director of spring sales in the manufacturers products sales division. During the war he served as special representative on aviation products and in 1946 was named assistant manager of the wire rope and construction materials division.

* * *

THE other appointment names **Edwin T. Eggers** to the latter position, succeeding Mr. Meyers. Mr. Eggers started with American Steel & Wire Co. in 1934 after five years with several engineering and construction companies.

* * *

Van Dike to Represent Roebling in Detroit

JOHN A. Roebling's Sons Company, Trenton, N. J., manufacturers of wire rope and wire products, through E. C. Low, vice president in charge of sales, announces the appointment of **L. H. Van Dike Jr.,** as Detroit, Michigan, representative, replacing the late Harry T. Hirbe, who died on November 24 in his thirty-first year.

* * *

VAN Dike, a former lieutenant in the USNR, is a graduate of Dartmouth College and the Tuck School of Business Administration. He has been associated with the company since 1946.

* * *

Gerhardt Retires from Bethlehem

R. B. Gerhardt, chief engineer of construction, **Bethlehem Steel Company,** retired, effective January first.

* * *

PRIOR to his appointment to that position, in 1938, Mr. Gerhardt served for a number of years as assistant general manager at Bethlehem's Sparrows Point and Steelton plants. He will be succeeded

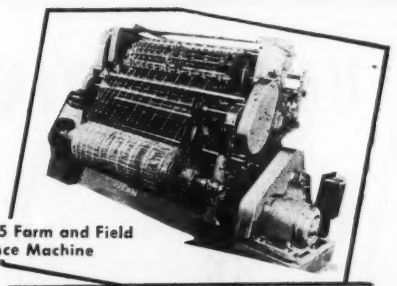
WEAN EQUIPMENT Corporation

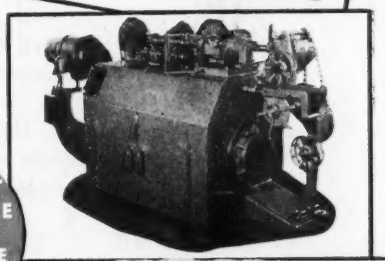
THE WEAN EQUIPMENT CORPORATION are recognized as specialists in high-efficiency strip and wire mill equipment.

COLD ROLLING MACHINERY
For 36" Wide Material and Narrower
MILLS - REELS - SLITTERS - LEVELERS
COILERS - EDGERS - SCALE BREAKERS - SHEARS
SCRAP BALLERS - CONTINUOUS PICKLING

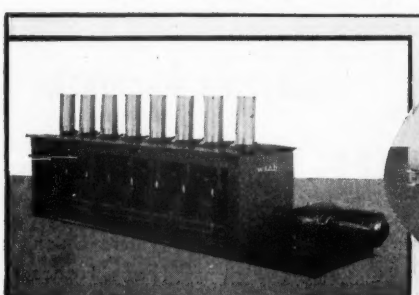
WIRE MILL EQUIPMENT
PATENTING, GALVANIZING AND TINNING TAKE-UP FRAMES
WIRE FLATTENING MILLS - SPOOLERS - NAIL GALVANIZING AND BLUEING EQUIPMENT - FIELD FENCE AND BARBED WIRE MACHINES

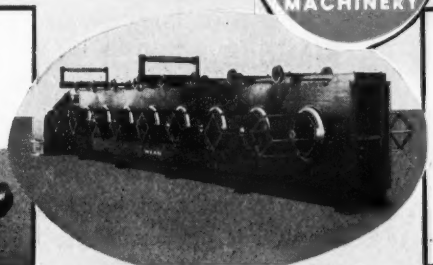
WEAN EQUIPMENT CORPORATION
22800 LAKELAND BLVD • CLEVELAND, OHIO

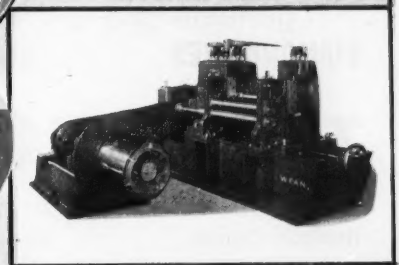

No. 1155 Farm and Field Fence Machine


Barbed-Wire Machine

HOLMQUIST BARBED WIRE and WIRE FENCE MACHINERY


8 Block Fine Wire Tinning Take-up Frame


16 Block Wire Galvanizing Take-Up Frame


Strip Reel and Slitting Unit

by L. J. Gould, assistant chief engineer of construction since 1939, and prior to that time assistant superintendent of the mechanical department, Sparrows Point for twelve years. Mr. Gould's successor will be A. J. Fisher, fuel engineer at Sparrows Point since 1929. Mr. Fisher has been elected National President of the Association of Iron and Steel Engineers for 1948.

* * *

International Nickel Promotions

RALPH D. Parker and **J. Roy Gordon**, of Copper Cliff, Ontario, and **Herbert G. Fales**, of New York, have been elected Assistant Vice Presidents of **The International Nickel Company of Canada, Limited**, Robert C. Stanley, Chairman and President, has announced.

* * *

AT the same time Mr. Stanley announced the election of **Walter C. Kerrigan**, **James F. McNamara** and **T. H. Wickenden** as Vice Presidents of the Company's United States subsidiary, **The International Nickel Company, Inc.**

* * *

DuPont Makes Appointments

THE **Du Pont Company** has announced promotion of **Harry F. Brown** to general manager of its Explosives Department and **Samuel G. Baker** to general manager of its Electrochemicals Department. Both men have been assistant general managers of the departments they will head, effective January 1.

* * *

MR. Brown succeeds William H. Ward who was elected a vice president of the company this week and Mr. Baker succeeds F. S. MacGregor whose retirement after a successful career of 31 years was also announced today.

* * *

MR. Baker started working for the company in 1923 on a powder line in the Explosives Department's Du Pont, Wash., plant. He left the company six months later and returned in 1925 as a chemist at the Eastern Laboratory and the Rapauno Works, Gibbstown, N. J.

* * *

AFTER holding supervisory positions there, he was transferred in 1927 to the Barksdale, Wis., Works for the next three years. In 1930, he returned to the Eastern Laboratory as a chemist, and two years later became a special assistant at the Wilmington office. In 1933, Mr. Baker entered the Sales Division and was made assistant manager of sales in the New York office in 1935.

* * *

IN 1943, Mr. Baker joined the Electrochemicals Department as director of the Electroplating Division, becoming assistant general manager of the Electrochemicals Department in 1945.

* * *

Atlas Steels Ltd., Appointments

H. **B. Chambers** has been appointed chief service metallurgist and **T. H. Adair**, chief plant

UNION DIE ROOM MACHINERY

92% of all die rooms in the United States and Canada are using UNION die drilling and recutting equipment. That is amazing but true.

If you are expanding or modernizing your die room you just can't afford to overlook UNION machinery, when you consider such a record for use by the wire industry.

UNION'S new multiple-spindle automatic equipment can help you attain maximum labor saving, efficiency, and precision in servicing your tungsten carbide and diamond dies.

Send for our catalog M-1.

DIAMOND DIES **DIAMOND POWDER** **RECUTTING MACHINERY**

THE UNION WIRE DIE CORP.

24 Gore Street, Hamilton, Ontario
71 West 45th Street, New York City 19
375 Fairfield Ave., Stamford, Conn.
La Filiere Union, Paris, France

metallurgist, of **Atlas Steels Ltd.**, Welland, Canada. Prior to joining Atlas Steels in 1931, Mr. Chambers was associated with the Pittsburgh Crucible Steel Co. and Timken Roller Bearing Co. Mr. Adair has been with Atlas Steels in the metallurgical division since 1934.

* * *

American Steel & Wire Appointments

RAYMOND W. Drake has been appointed manager of sales, Wilkes-Barre, Pa., sales office, **American Steel & Wire Co.** Mr. Drake has been connected with the American Steel & Wire Co. for 10 years, starting in the company's Trenton works as a clerk. He later became division supervisor of production planning, and in 1943 he transferred to the company's sales department and was assigned to the Wilkes-Barre office. As manager of sales at Wilkes-Barre he succeeds **Bruce D. Bennett**, who has been transferred to Chicago as manager of electrical wire rope and construction materials sales in the company's offices there.

* * *

To Manage John Ek Industries

GEORGE N. Vitt has been made manager of **John Ek Industries, Inc.**, Guilford, Conn., manufacturers of salt bath furnaces and automatic installations for metallurgical processes. Mr. Vitt is also secretary and a member of the board of directors of the company. He was formerly associated with the A. F. Holden Company as assistant to the president.

* * *

Frederick P. Huston

FREDERICK P. Huston, engineer and metallurgist in the Development and Research Division of The International Nickel Company, Inc., at New York, died on December 29, from the effects of a heart attack he had suffered recently at his home, 281 South Avenue, Fanwood, New Jersey. He was fifty-seven years old.

Leonard C. Rose

LEONARD C. Rose has been named director of purchases for all divisions of **Colorado Fuel & Iron Corp., Denver.** Mr. Rose formerly was director of purchases for the Colorado Division of the company only, and has been associated with CF&I since 1929.

* * *

Joseph Frank Luckman

THE sudden death of Joseph Frank Luckman last October marked the end of a very notable career devoted almost solely to the Steel Wire Trade.

* * *

IN 1886 Frank Luckman joined the firm of Webster and Horsfall who were the pioneers of the high tensile Wire Industry which we know today, and at that time were challenged by none save Rollsson's —another Birmingham firm.

* * *

AFTER his first few years on the commercial side, he concentrated his entire efforts on research

THE 1948 ANNUAL CONVENTION

will be held in Pittsburgh, Pa., at the

WILLIAM PENN HOTEL

October 18th through the 22nd.

Please note that the Convention will occupy five full days this year, instead of four, as heretofore. Enter these dates on your calendar now and plan to attend the big meeting

THE WIRE ASSOCIATION

300 Main Street **Stamford Conn.**

and improvement in the manufacture of high tensile wire.

* * *

AT the close of the century an amalgamation took place between the original firm and the combination of the late Arthur Latch and T. C. Bachelor. The new section wires for T. C. Batchelor's inventions were primarily the work of the late **H. C. Horsfall** and Frank Luckman, who developed and expanded the wire department in the factory in which the work of Bachelor and Latch was completed.

HE also carried out the initial wire experiments and actual manufacture of the first Dunlop tires.

* * *

HE contributed much to the success of Bowden's brake mechanisms with the shaped wire for the casings in addition tc the cables, and the valve spring requirements for the rapidly expanding Motor and Aircraft trades in World War I were chiefly found from Wire of his manufacture. The successful retubing of the Wire Wound Naval Guns was greatly facilitated by his discoveries regarding the elimination of stress in wire and he finally produced a perfect wire for Shell Fuses after the failures and lack of uniformity of this vital material in 1914 and 1915.

* * *

IN addition to his life's work, Frank found time to act on the Old Yardley Council and was a City Councillor from 1911 to 1914 when he resigned in order to give his full effort to war requirements. He was a great believer in sports and in particular, a notable rifle shot which he turned to good account in training the Volunteer Unit (3rd Warwicks) in the first World War and the Firm's Home Guard in the late struggle. A staunch supporter of every project for the good of the local community and his work people, he will be greatly missed by all associated with him.

* * *

Changes Corporate Name

ON January 1, 1948, the **Nichols Wire and Steel Company**, Davenport, Iowa, will become the **Nichols Wire and Aluminum Co.**

* * *

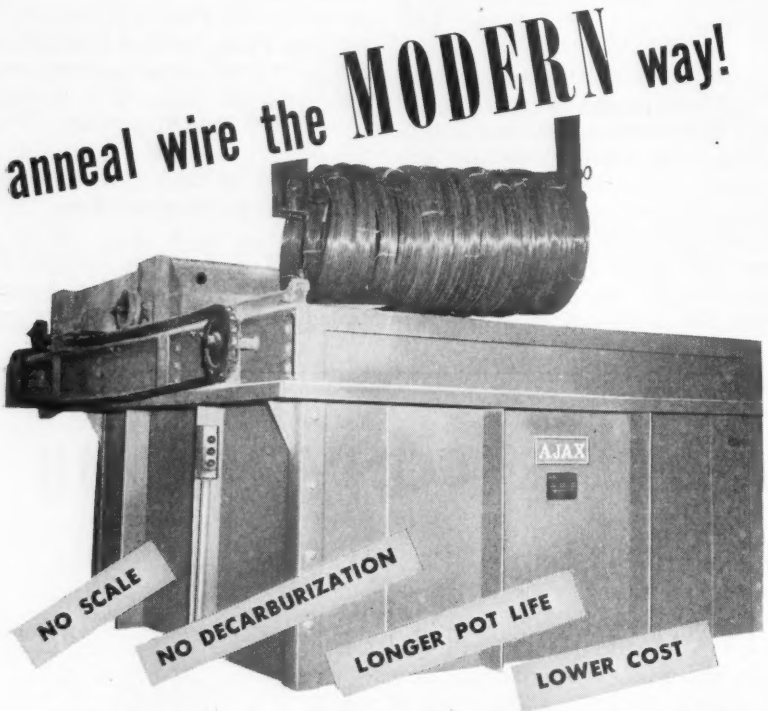
APPROXIMATELY two years ago, largely because of the steel shortage, the company started to process aluminum and have found that for many applications it is not a substitute, but a material with qualities that enable it to stand on its own feet competitively. They are sold on it and have decided to keep aluminum as a permanent part of their operations, and possibly the most important part of their business.

* * *

BESIDES producing aluminum wire in various forms, they manufacture aluminum roofing and siding, nails, barbed wire, clothes lines, telephone and telegraph wire, fencing and other products.

* * *

IN his announcement, **Frank R. Nichols**, President, states that there is no gray market in aluminum, their suppliers have dealt fairly with them and that their customers have accorded aluminum wire products an enthusiastic response.



You'll save money, you'll improve efficiency along many lines with the unique Ajax Electric Salt Bath wire annealing method. It requires less floor space, less labor, less maintenance. Heating cycles average less than 20 minutes, even on difficult jobs. There is no scaling, no decarburization, no explosion hazard, none of the bothersome problems entailed with atmosphere equipment. Salt bath treating does the work faster, better, cheaper!

Ideal for annealing low- or high-carbon and stainless steel wire and rod; annealing aluminum, and copper and silver alloys; and for descaling stainless and alloy steel wire in molten salt baths.

AJAX ELECTRIC COMPANY, INC.
Frankford and Delaware Aves. · Phila. 23, Pa.
The World's Largest Manufacturer of Electric Heat Treating Furnaces Exclusively

WRITE FOR YOUR COPY!
This 72-page Ajax booklet tells the entire story of salt bath heat treatment as applied throughout modern industry. Ask for Booklet 116.

AJAX
HUTTGREN
ELECTRIC SALT BATH FURNACE

Syncro Announces English Affiliate

SYNCRO Machine Company, 611 Sayre Avenue, Perth Amboy, New Jersey, manufacturers of machinery for the wire industry, announce their new English affiliated company, **Winget-Syncro,** located at Rochester, Kent, England.

* * *

THE appointment of Winget-Syncro is of twofold importance. It provides the overseas trade with the opportunity to secure the well-known Syncro line of wire drawing equipment, through Winget-Syncro's branch offices or agents on the continents of Europe, Asia, Africa, Australia and New Zealand. In addition, it solves the purchasing needs of the wire drawing trade located in the Sterling area who have found it impossible under present economic conditions to purchase equipment outside of the area.

* * *

THE sales company, Winget-Syncro is associated with Winget Ltd. also located at Rochester, Kent, England. Winget Ltd. has extensive manufacturing facilities and will make the complete standard Syncro line of machines as well as produce special machines for out-of-the-ordinary requirements.

* * *

THE newly formed sales company has been staffed with engineers and personnel who have been trained in the Syncro factory at Perth Amboy, New Jersey and who have travelled extensively through the wire drawing trade in the United States—learning the latest American methods. As a result they are able to furnish overseas prospects and users with the benefits of Syncro Manufacturing Company's outstanding contributions to the wire drawing industry.

Auto-Lite Buys Plant

ROYCE G. Martin, President and Chairman of the Board of Directors of **The Electric Auto-Lite Company,** has announced the acceptance of the Company's bid for the former Wright Aeronautical plant at Lockland, Ohio.

* * *

THE purchased plant, which consists of more than 4,000,000 square feet, was obtained to alleviate congested conditions at the Lamp Division of the Company in Cincinnati. The purchase price was $8,400,000.

ADVERTISING

is a service to a magazine's readers. Methods, materials and machinery were developed under the stress of war. Both editorial matter and advertisements keep you informed on what is happening in industry.

New improvements in ...
Assure better performance from...
NOPCO WIRE DRAWING COMPOUNDS

LIKE ALL NOPCO* DEVELOPMENTS, NOPCO metal working products are subject to *continuing* improvement through *continuing* research.

NOPCO LABORATORIES, for example, are now conducting an extensive research program with the primary purpose of effecting several improvements in NOPCO's brass, copper and aluminum Wire Drawing Compounds. Among these improvements are:

1. **Changing the structure of the fats and oils in these compounds, thus enabling them to create a *stronger* bond between metal and lubricant.**
2. **Producing *more stable* fatty compounds.**

THESE SPECIAL RESEARCH PROJECTS do not *supplant* . . . rather they *supplement* NOPCO's regular activities in the production of metal working products.

NOPCO INVITES INQUIRIES from Wire Manufacturers regarding the possible application of these new, improved Wire Drawing Compounds to their products.

*Reg. U.S. Pat. Off.

NOPCO TRADEMARK EVOLVED THRU RESEARCH

NOPCO CHEMICAL COMPANY, Harrison, N. J.
FORMERLY NATIONAL OIL PRODUCTS COMPANY
BRANCHES: BOSTON • CHICAGO • CEDARTOWN, GA. • RICHMOND, CALIF.

A Review of Recent Wire Patents

No. 2,431,668, APPARATUS FOR COILING VOLUTE SPRINGS, patented November 25, 1947, by Lester A. Klee, Hammond, Ind., assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey.

There are 14 claims in this patent covering apparatus including a rotatable mandrel and a guide beam being normally disposed in a vertical plane perpendicular to the axis of the mandrel and being pivoted at its end nearest the mandrel.

* * *

No. 2,431,728, TREATMENT OF FERROUS METALS TO IMPROVE RESISTANCE TO RUSTING, patented December 2, 1947 by Gerson Kurt Bergstein, St. John's Wood, London, England, assignor, by mesne assignments to Despo Manufacturing Co. Limited, London, England, a British company.

The treatment comprises preheating and subjecting them at a temperature between 100° and 200° C. to an aqueous alkaline bath containing from 28.5% to 42.5% solid caustic soda, 3.25% to 15% alkali silicate, 2.33% to 9.5% of an oxidizing agent, such as alkali metal nitrate, alkali metal nitrite, alkali metal peroxide or nitrophenol, the balance being an amount of water rather less than the weight of solids.

* * *

No. 2,431,818, GARMENT HANGER, patented December 2, 1947 by William W. McFall, River Forest, Ill.

This hanger is mostly of wire and includes a wire yoke having downwardly diverging garment shoulder-supporting arms turned inwardly at the lower extremeties with laterally disposed, radially opening bights for supporting an elongated garment supporting strut, the bights being of between 180° and 360° arcuate extent and proportioned in diameter and in the spacing of the adjacent ends thereof for frictional radial reception and retention of the strut. There is also provided a retainer element integral with and extending between the bights in flexible contact with and parallel to the strut to oppose undesired displacement of an article of apparel therefrom.

* * *

No. 2,431,928, APPARATUS FOR FORMING WIRE COILS, patented December 2, 1947 by Armand J. Garreau, Newport, R. I.

There is provided a rotatable arbor having spaced wire guide pins upon which the wire is wound, with a device for rotating the arbor, and for periodically stopping the arbor rotation to provide dwell intervals, reciprocable plunger mechanism having cam ends to move into engagement with the wire at one pin and to bend the wire about this one pin. There is also means for reciprocating the plunger mechanism in timed relation to the arbor rotation to contact the cam ends with the wire and produce the wire bending during the dwell intervals.

* * *

No. 2,432,080, DEVICE FOR FORMING HELICAL COILS, patented December 9, 1947 by Charles Anthony, Philadelphia, Pa.

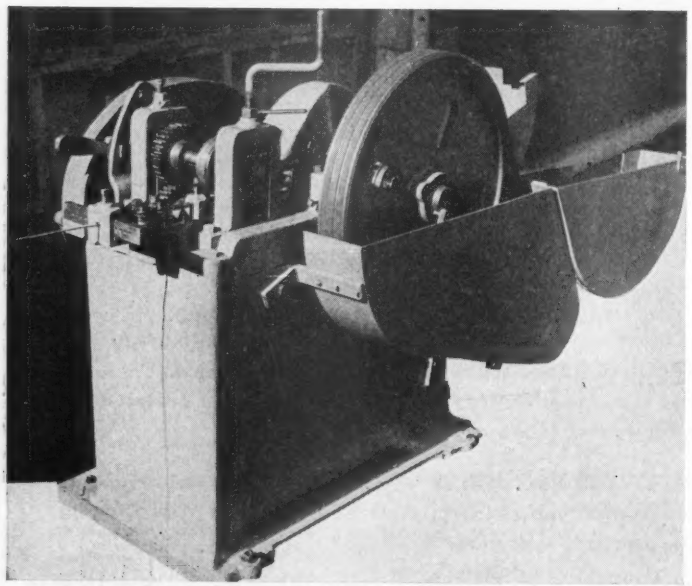
A hand-operated machine is provided to wind closed or open coils.

* * *

No. 2,432,603, SEGMENTAL CABLE, patented December 16, 1947 by George Willard Zink, Bridgeport, Conn. assignor to Phelps Dodge Copper Products Corporation, Dover, Del., a corporation of Delaware.

Electrical cable is patented comprising a single round conductor, the conductor comprising a plurality of sectors cabled in a helical lay, each sector comprising a number of helically laid bare wires, the sectors having rounded corners, leaving valleys where they meet and a layer of helically laid individually bare wires enclosing all the sectors to form a circular cross-section applied

Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States and Canada $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.



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MAKES FENCE STAPLES — POULTRY NETTING STAPLES — DOUBLE POINTED TACKS

Moderately priced — Belt or motor driven.

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Manufactured Exclusively for:

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CHANIN BLDG., 122 EAST 42nd ST., NEW YORK 17, N. Y., U.S.A.
REG. CABLE ADD.: "LOUREED, NEW YORK".

Wire Bale Tie Machines, producing single loop, round or oval ties, 2000 per hour; 3 to 16 ft.

with its lay opposite to the lay of the assembly of the sectors so as to bridge the valleys.

* * *

No. 2,432,623, ENAMEL CONTAINING FURFURYL ALCOHOL CONDENSATE AND POLYVINYL ACETAL, patented December 16, 1947, by Henry J. Kauth, Schenectady, N. Y., assignor to General Cable Corporation, New York, N. Y., a corporation of New Jersey.

As an enamel coating for conductor wires, the inventor condenses furfuryl alcohol to a density not less than 14.8° nor greater than 17.4° Baume at 70° C. stops the further condensation thereof, thins the condensate with a naphtha-cresol solvent and adds thereto a solution of polyvinyl acetal in naphtha-cresol, the major portion of the solids in the blended solution consisting of the furfuryl condensate.

* * *

No. 2,432,854, APPARATUS FOR CLEANING AND COATING WIRE, patented December 16, 1947 by John A. Bassett, Westchester, and Andrew S. Niemiec, Cicero, Ill., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

Included is a container for a supply of molten material having a wall aperture extending above and below the surface level of the material, and a movable member to close said aperture and provide a smaller aperture movable from above to below the surface level of the molten material for carrying a strand inserted therein beneath the material's surface.

* * *

No. 2,432,901, RUST INHIBITING OIL COMPOSITION, patented December 16, 1947 by Sven Christian Johansson, Gothenburg, Sweden.

To the ore is added an alkali metal salt of nitrophenol being present in an in the oil and a solvent such as amyl-alcohol or amylacetate for solubilizing the alkali metal salt, the alkali metal salt of nitrophenol being present in an amount sufficient to inhibit corrosion by the oil.

No. 2,433,014, APPARATUS FOR HANDLING METALLIC STRIP, patented December 23, 1947 by George H. Rendel, Gary, Ind., assignor to Carnegie-Illinois Steel Corporation, a corporation of New Jersey.

More specifically, the invention comprises a tension apparatus for use with the strip-moving means.

* * *

No. 2,433,346, RIBBON CABLE AND METHOD OF MANUFACTURING SAME, patented December 30, 1947 by Gerald Deakin, New York, N. Y., assignor to International Standard Electric Corporation, New York, N. Y., a corporation of Delaware.

For telecommunication systems, the cable is made by feeding lengthwise a continuous strip of insulating material having a series of holes in spaced relation and aligned lengthwise, delivering a continuous length of bare conductor wire so as to extend lengthwise along a face of this strip in register with the holes, projecting portions of the wire through these holes, one after the other to form successive loops in the wire at the opposite face of the strip, laying the loops in flat relation to the opposite face of the strip and extending transversely of the length of the strip, and fastening the loops in position on the face of the strip.

* * *

No. 2,433,642, WIRE COATING DIE, patented December 30, 1947 by Carl A. Bailey, Scotia, N. Y., assignor to General Electric Company, a corporation of New York.

In coating polygonal wire, there is provided a number of side members each having a head provided with a bore and an elongated cylindrical rod carried by each head and being adjustable thereon, the rod of one side member being slidably mounted in the bore of another member. Springs are provided for biasing the side members toward each other.

* * *

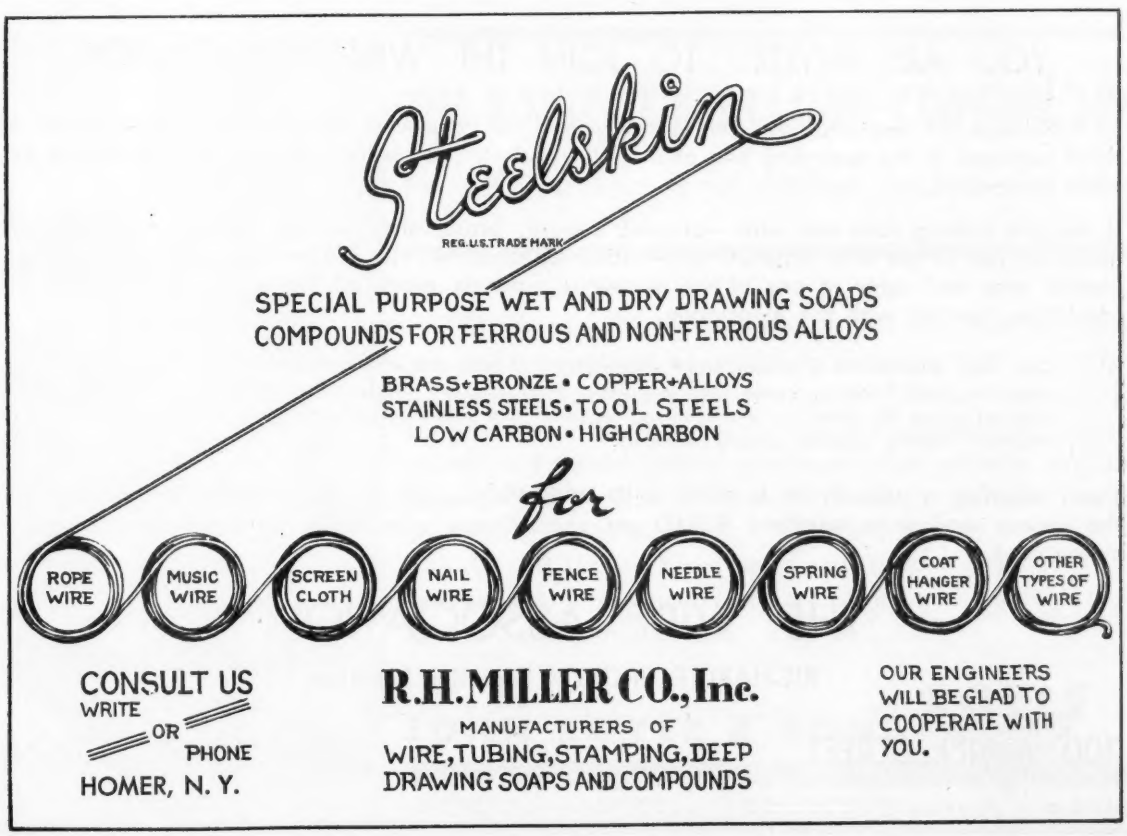
No. 2,433,673, DIE FOR COATING WIRE, patented December 30, 1947 by Bernard Mulvey, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York.

Rectangular wires are coated by means of a die having two bars provided with parallel wiping surfaces, the bars having parallel and aligned openings, with a pair of spaced rods projecting through the openings, and a spring biasing the bars towards each other, the spacing of the rods being greater than the width of the wire to be coated.

* * *

No. 2,433,729, ELECTRIC CABLE, patented December 30, 1947 by Charles E.

(*Please turn to page* 182)



KENNETH B. LEWIS 1915 PREDICTIONS

In 1915 Kenneth B. Lewis wrote a short report for one of the technical papers on the outlook for the Wire Industry.

In this report are definite leads to the carbide die, the Morgan-Connor and Vaughn machines, the flash baker, the block-stripping crane, inhibitors, and the CIO.

It is very interesting to look back and see the ideas existing thirty two years ago. An abstract from the report follows:

1915
The Wire Outlook

AN outstanding fact in recent wire development is the firm establishment of the cast iron die. Die costs now run as low as 33 cents a ton. A die hole will generally finish a 300 lb. bundle within commercial tolerance.

* * *

IT is hard to refine wire machinery in the face of a general disinclination to pay over $300 per block for rod frames, but some discussion of cut gears is heard. We continue to hear rumors of continuous dry drawing in British mills, forced by union restrictions, but here no one takes any stock in the possibility of either union interference or continuous rod drawing. Mills here report drawing speeds as high as 400 f.p.m.

* * *

OUTPUT per man has apparently reached its peak. It can be figured closely by dividing 25000 lb. by the number of drafts plus one. This works out; for 2 hole 10, 8300, 3 hole 12, 6250, 4 hole 14, 5000. This formula shows that the limiting factor is the tonnage a man can lift in a day, and this factor will change only when we breed a race of supermen.

* * *

IT has been proven that it pays to bake rods at higher temperature and to provide definite ventilation. If the flues are kept under a grid floor and if air is admitted beside them and vented through holes in the roof, baking time can be cut from 24 hours to 5 or 6 hours. Temperatures as high as 350 F. are safe, if the circulation is good.

* * *

IN Europe, where the explosives industry is absorbing all the acid, pickling is being done with "nitre cake", a sulphuric material carrying nitrogen, and the wire is said to absorb less hydrogen than usual. This compares interestingly with experiments here in the use of protein-bearing additions such as red-dog flour, and leads to speculation as to whether these inhibiting compounds will ever come into practical use in the wire mill.

* * *

An ADVERTISER likes to know his ads have been read so please mention WIRE & WIRE PRODUCTS when writing him.

YOU ARE INVITED TO JOIN THE WIRE ASSOCIATION

To those wire mill men who have not already joined the Wire Association for the mutual benefit of those engaged in the operating end of the Wire Industry, a cordial invitation is extended to become a member.

If you are making rods and wire —of steel, copper, brass, alloy or any ferrous or non-ferrous metal, or are in the wire products end— nails, bolts, screws, rivets, wire rope, wire cloth, springs, electric wire and cable or any of the numerous products made of wire, you will benefit by identifying yourself with the Association.

The Wire Association is a non-profit organization of wire and wire products mill superintendents, executives and foremen, whose specific purpose is to improve production methods and afford a clearing house for ideas on management, technical and research problems, and to develop and maintain friendly relations among members.

Dues, including a subscription to WIRE AND WIRE PRODUCTS, a copy of the BUYERS GUIDE and the various services to members, $15.00 per year. Please write today for a membership application card.

THE WIRE ASSOCIATION

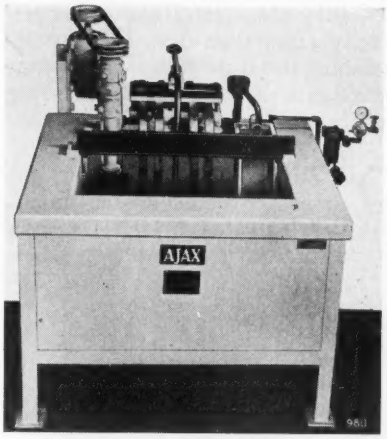
RICHARD E. BROWN, Executive Secretary

300 MAIN STREET STAMFORD, CONN.

The New Ajax Isothermal Quench Furnace

THE Ajax Electric Company, Philadelphia, Pennsylvania, is offering a new design of the well known Ajax Hultgren Electric Salt Bath Furnace for use with the Ajax Isothermal Heat Treat Process. This process involves interrupted quenching such as is used in martempering, austempering and cyclic annealing. By utilizing TTT or "S" curve data now available for most steels, the isothermal process offers a tool of incalculable value for imparting remarkable new physical properties to metal parts. The heart of the process is the Ajax Isothermal Quench Furnace (shown in the attached photograph) which employs the principles of a heat exchanger to hold the quenching bath at a constant temperature. Since the work transfers a great amount of heat to it, the bath must be capable of absorbing and dissipating this heat to avoid temperature build-up.

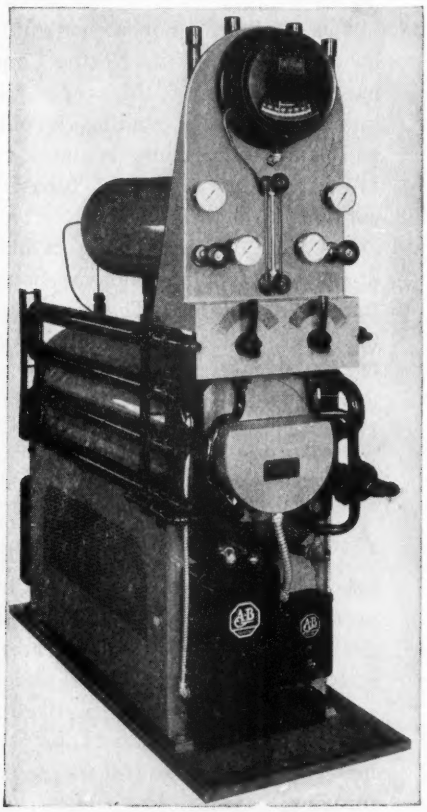
IN order to provide the maximum cooling power, it is essential that the bath be agitated vigorously to extract the heat from the work being quenched, as rapidly as possible. Without this provision, it is not possible to achieve the optimum



physical properties which the isothermal heat treat process offers. The isothermal quench furnace is provided with a motor operated, high capacity, submerged pump as shown on the left hand side of the photograph. The outlets of this pump subject the work to a fast moving stream of molten salt which gives the quenching power of warm oil and thus assures uniform and maximum quenching speed of each individual piece introduced into the furnace.

* * *

IN martempering and austempering, the work is usually austenitized by heating in a neutral salt bath prior to quenching in the isothermal quench bath. The problem commonly associated with this two-furnace set up is that of contamination of the low temperature quenching bath by salt carried over with the work from the high temperature austenitizing bath. This problem is now eliminated by a recently developed salt separator which is immersed directly in the isothermal quench bath. The salt separator (shown on the right hand side of the photograph) is comprised of a screen filter and an air pump. The air pump lifts the liquid salt



THE ROYLE TEMPERATURE CONTROL UNIT

For Extrusion and Other Industrial Uses

A compact, simply operated unit designed to sustain any pre-determined temperature between 90°F and 475°F. — Hand-lever selection of desired temperature — Heat supplied — or drained — according to operational requirements — Formed piping, elimination of gaskets, and drip pans promote cleanliness — Breakdown of heat transfer oil reduced to a minimum — Three standard sizes 16KW, 32KW, 48KW — Other units with water circulation and refrigeration for operations requiring constantly maintained lower temperatures, 35°F to 200°F.

JOHN ROYLE & SONS ROYLE PATERSON N. J.

PIONEER BUILDERS OF EXTRUSION MACHINES SINCE 1880

London, England — James Day (Machinery) Ltd — REgent 2470
Home Office — E. B. Trout, J. W. VanRiper — SHerwood 2-8262
Akron, Ohio — J. C. Clinefelter — JEfferson 3264
Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

from the main bath into the filter, during which passage the salt is cooled with a resultant precipitation of the salt contaminaton mentioned above. The precipitate is collected in the screen filter and the clarified quench salt returns to the bath. The quench bath is thus kept clean automatically and no replenishment is necessary except for the normal drag-out.

* * *

THE isothermal quench furnace can be heated either by immersed electrodes for high temperature work, or by immersion heating elements for low temperature work.

G. E. Introduces Hevimet to Line of Metallurgical Products

INTRODUCTION of Hevimet, an alloy of tungsten, copper and nickel, to **General Electric's** line of metallurgical products is announced by the Metallurgy Division of the Company's Chemical Department. The alloy possesses a density 50 per cent greater than lead and is applicable to the design and construction of moving parts possessing maximum inertia and minimum size.

* * *

ORIGINALLY developed in response to demands for a material of high density for use on a gamma ray screen, Hevimet is adaptable to the construction of balance weights for the elimination of vibration in crank-shafts, modern air screws, centrifugal clutches and other rotating parts. Combining great tensile strength with good machinability, G-E Hevimet is highly resistant to atmospheric salt water corrosion and easily plated with cadmium, chromium and nickel. It can be silver soldered and brazed by standard methods.

* * *

A sintered material, Hevimet is made in a variety of nonporous sheets and blocks. Complex shapes may be built up from simple pressing by a special process of hydrogen welding. The average product has a density from 16.8 to 17 grams per cu. cm., a tensile strength of 85,000 to 118,000 lbs per sq. in., a Rockwell hardness of 30 to 40 "C" scale.

* * *

Houseorgan Has Article on Lapping

A recent issue of Grits and Grinds, a technical houseorgan published monthly by the **Norton Company**, Worcester 6, Mass., in the interest of better grinding, lapping and surface finishing, contains an article on the lapping of tungsten carbides through the use of Norbide abrasives. Concerns having carbide die and tool lapping problems should find it of interest. This appeared in the issue for November, 1947, No. 11, Volume 38.

* * *

Heat for Metals

A booklet entitled, "Heat for Metals," has just been published by **Surface Combustion Corporation**, Toledo, Ohio, which is descriptive of the company's broad activities in metallurgical research, and the designing and manufacturing of heating equipment for the metal producing and working industries.

For Better Continuous Extrusion Takeup···

ONE COMPACT MACHINE DOES THE *Whole Job!*

● That's all it takes — just *one* compact machine to perform *all* the functions of continuous extrusion takeup operations.

This new constant tension continuous takeup with integral capstan and drive was developed as the result of many years of experience by IOI engineers in the design of winding equipment.

The machine features an adjustable constant tension reel drive and an ingenious and efficient system of loading and unloading reels without interrupting the winding process.

Precision traverse mechanisms of various types developed by IOI to level lay wire provide either automatic or manual crossover from full to empty reel.

Lightweight, precision-machined capstans are balanced dynamically for top operating speeds. Capstan and reel drives are hydraulically synchronized so that one speed adjustment controls both.

Heat at Work...in CONTINUOUS OPERATIONS

For complete information on this machine as well as other IOI developments in continuous extrusion takeup equipment write for "Blueprint for Industry," Part IV. It's free for the asking.

INDUSTRIAL IOI ENGINEERING VERSATILITY OVENS, INC.

13825 TRISKETT ROAD CLEVELAND 11, OHIO

ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON W. I. ENGLAND

THE booklet consists of thirty-two pages. Subjects include the latest developments in heating equipment for steel mills, the history of the development of gas chemistry and heat treatment; prepared gas atmospheres and heating equipment applications to processing such as gas carburizing, carbon restoration, atmosphere hardening, gas normalizing and annealing, gas cyaniding, gas quenching, gas malleableizing, and atmosphere heating for forging. In addition, standard industrial furnaces, and burner systems and equipment are described.

* * *

"HEAT for Metals" booklet is a ready reference on modern heat treating methods and equipment.

* * *

COPIES are available only by request from the Surface Combustion Corporation, on your company or professional letterhead.

* * *

New Drawing Compound Developed

THE Glycolube series of lubricating compounds (patents pending) developed especially as modern lubricants for drawing, sheeting and stamping non-ferrous metals is now being manufactured by Glyco Products Company, Inc., of Brooklyn, N. Y. and New Martinsville, W. Va.

* * *

THE experience of a limited number of the largest metal-working mills in the country to which Glycolubes have been made available for many months has demonstrated that they make possible increased operating speeds and considerably prolonged life of the dies with which they are employed. The faster processing, longer die life and ease with which Glycolubes may be handled permit substantial economies to be realized.

* * *

GLYCOLUBES result in a brighter product, automatically apply a film which acts as a temporary corrosion inhibitor, and permit continuous lubrication. Since Glycolubes do not break down during operation or produce scum, the conventional necessity for continually renewing or discarding the lubricant is eliminated. In operations where Glycolube is to be added, this can be done conveniently and without interrupting the process.

* * *

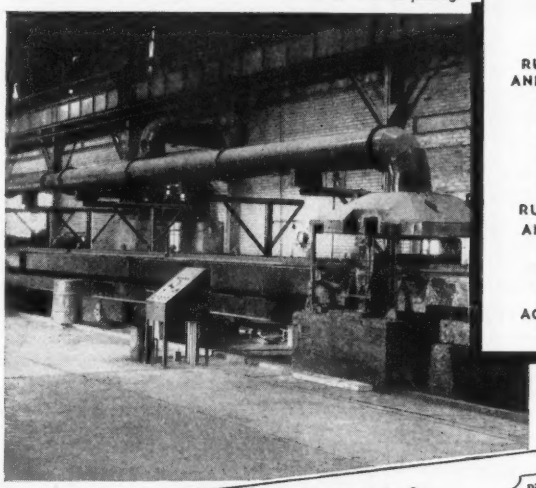
GLYCOLUBES are available in various forms, ranging from liquids to solids and from water-soluble or water-dispersable materials to oil-soluble materials. One compound in the series of 12 compounds is both water and oil dispersable. Certain members of the Glycolube family are designed for wet drawing, others for dry drawing.

FOR wet drawing, a solution of 2 to 5 per cent Gycolube and water usually is the most satisfactory. In some processes, the stock to be drawn dry may be dipped into a solution of the Glycolube before the operation, then allowed to dry and then processed. This makes possible reduction of the amount of lubrication at the die.

* * *

WHERE a series of dies are used in dry drawing, the use of Glycolube often reduces the number of lubrication boxes required.

"RODINE" is used effectively in continuous as well as in batch pickling.



CHEMICALS ACP PROCESSES

RUST PROOFING AND PAINT BONDING
Granodine *
Duridine *
Alodine *
Lithoform *
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RUST REMOVING AND PREVENTING
Deoxidine *
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PICKLING ACID INHIBITORS
Rodine * ®

Chemicals for Rust Proofing Paint Bonding

American Chemical Paint Co.
TECHNIGRAM
AMBLER, PA.

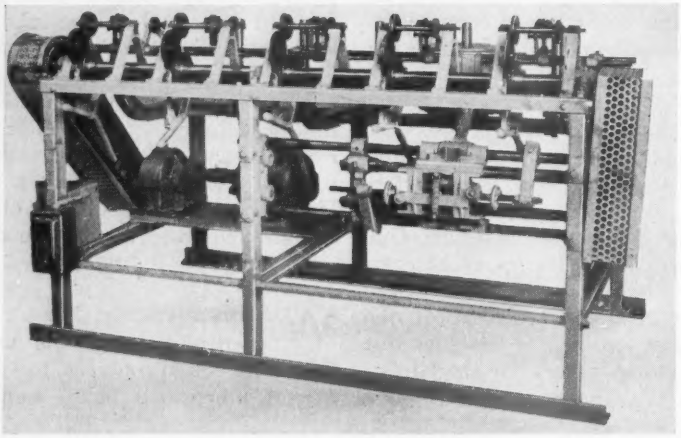
Pickling Acid Inhibitors Rust Removing Preventing

To: Those Interested in Efficient Pickling
Address: Everywhere -- Anywhere

RODINE* -- saves metal -- controls acid attack -- minimizes over-pickling and hydrogen embrittlement -- prolongs life of the acid bath -- saves acid -- holds down fumes -- facilitates scale removal. Just add a little to the Sulfuric or Muriatic acid bath -- For better pickled surfaces -- speed -- economy -- use "RODINE"

Send for full list of ACP metal treating chemicals--of interest to all processors of iron--steel--aluminum and copper products.

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.



NO. 300 MULTIPLE SPINDLE SPOOLER

This machine spools fine wire from .005 to .030 diameter and has a spool flange capacity of 7". Wire tension and traverse adjustments are easily made, and spindles can be started or stopped individually. Any desired lay of wire is easily obtained by a simple change of gears. Non friction bearings used throughout.

All Emory spoolers may be adapted to customer's operating conditions.

On Spooling problems consult

ROBERT J. EMORY COMPANY

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The first and the finest

GALVANIZING FLUX

No wonder H-VW-M No. 20 Galvanizing Flux—the first patented flux successful in hot galvanizing—is pronounced by so many galvanizers—"finest for the work." Years of experiments, years of study, produced H-VW-M No. 20—a flux "tailor made" to give a superior zinc adherence—a smooth, ductile coating and to reduce dross.

See for yourself what advantages No. 20 offers. For details, drop H-VW-M a line. Or ask for an H-VW-M engineer to call in person. It's likely his knowledge of problems like yours will lower operating costs, improve your product, and give you increased simplicity and control in hot galvanizing.

Ⓐ #2465

HANSON-VAN WINKLE-MUNNING COMPANY

MATAWAN, NEW JERSEY

Manufacturers of a complete line of electroplating and polishing equipment and supplies

Plants: Matawan, New Jersey • Anderson, Indiana

Sales Offices: Anderson • Chicago • Cleveland • Dayton • Detroit
Grand Rapids • Matawan • Milwaukee • New Haven • New York • Philadelphia
Pittsburgh • Rochester • Springfield (Mass.) • Stratford (Conn.) • Syracuse

SINCE 1820

Bulletin Describes New Metal

A new bulletin, Form F-633, describes FANWELD, which is a non-ferrous hard facing alloy of the cobalt-chromium-tungsten group, but differs from all other such alloys in that it contains tantalum-columbium carbide. This important ingredient imparts a "metallic lubrication," a low coefficient of friction so essential in combating abrasions.

* * *

A properly applied FANWELD facing will have a hardness of about 53 Rockwell C. This hardness is retained at high temperatures.

* * *

THE metal is non-magnetic, non-sparking, and is resistant to many forms of acid corrosion. Many mineral acids and most food acids have no effect upon the metal.

* * *

SUCCESSFUL applications of FANWELD include hot work punches and dies, trimming dies, mixer blades, pump sleeves, feed rolls, conveyor screws, and other parts subjected to abrasion, erosion, corrosion, heat or impact.

* * *

LITERATURE may be obtained from the manufacturer, **Fansteel Metallurgical Corporation,** North Chicago, Ill.

* * *

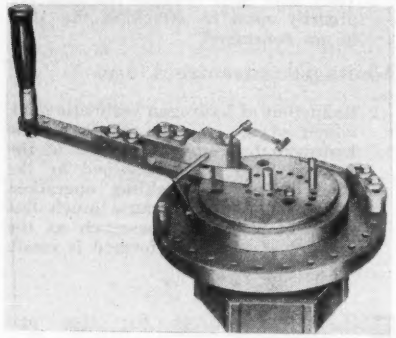
Bristol Publishes New Bulletin on Thermocouple and Pyrometer Accessories

A new Bulletin, No. P1235, covering thermocouples, protection tubes, and pyrometer accessories, has been published by **The Bristol Company.** The bulletin gives detailed drawings, complete information, and prices covering the accessories for pyrometers, which the company carries in stock for immediate shipment, at its main factory in Waterbury, and its branch factories in Akron, Chicago, and San Francisco. In addition, it contains a chart and valuable engineering data on selecting the right thermocouple and protection tube. Copies of the bulletin, No. P1235, are available by writing to The Bristol Company, Waterbury 91, Conn.

* * *

New Forming Machine Announced

O'NEIL-IRWIN Manufacturing Company, Lake City, Minn., has announced a new product of the company, known as Di-Acro Bender No. 1A for bending operations.



DI-ACRO Bender No. 1A O'Neil Irwin Mfg. Company. * * * * * *

THIS model retains all of the characteristics of previous models, but handles larger materials and has greater radius capacity. It will duplicate an unlimited variety of parts and eliminates the cost and time delays inherent in the making of special dies.

* * *

Wage Rate Report

A breakdown of 1,100 union contracts negotiated since the passage of the Taft-Hartley Act. Contains such details as name of company, name of union, amount of wage increase negotiated and a digest of the significant provisions of the union contract. Analysis covers contracts in 42 industries and is published by the Labor Relations Division of the National Foremen's Institute, Deep River, Conn. Price $2.50.

* * *

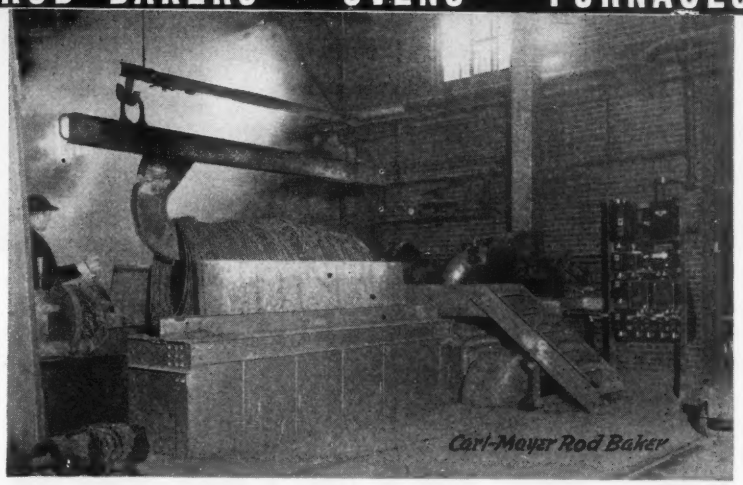
Steel Surface Conditioners

SURBRITE S and Surbrite H are developments of the **Hanson-Van Winkle-Munning Company**, Matawan, N. J. In short supply during the war period due to raw material restrictions, these products are again readily available.

* * *

SURBRITE S and Surbrite H may be broadly classified as acid in-

MORE PRODUCTION with CARL-MAYER HI-SPEED ROD BAKERS - OVENS - FURNACES



TYPICAL HI-SPEED ROD BAKER — DIRECT OR INDIRECT HEAT — Patented ANY FUEL
WRITE for BULLETIN No. 241

Growing interest in our type of equipment is evidenced by Carl-Mayer installations for such plants as:—

American Steel & Wire Co.
Atlantic Wire Co.
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Wickwire Spencer Steel Div
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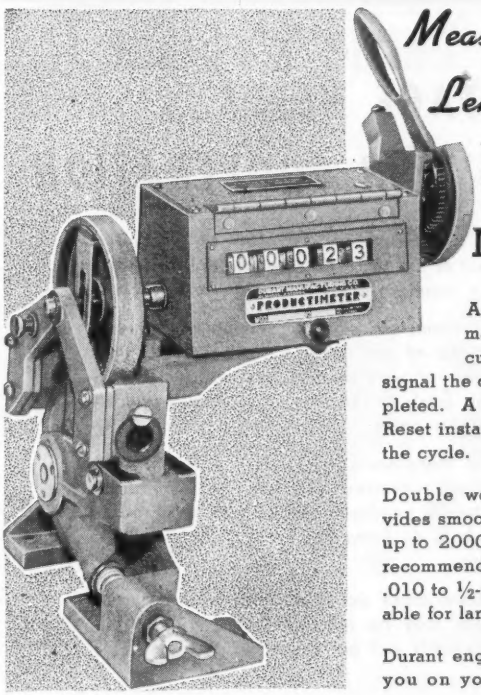
CLEVELAND, OHIO



Measure Predetermined Lengths of Wire on

PRODUCTIMETER

Model L-R-16-Q

An electric switch inside the counter may be wired to close or open a circuit, ring a bell, or turn on a light to signal the operator when the preset run is completed. A single stroke on the Quick Lever Reset instantly resets the counter for repeating the cycle.

Double worm drive reduction gearing provides smooth, continuous operation of counter up to 2000 feet per minute. Model L-R-16-Q recommended for bare or covered wire from .010 to ½-inch diameter . . . other units available for larger diameters.

Durant engineers are at your service to help you on your specific counting problems.

Write today for Bulletin No. 40

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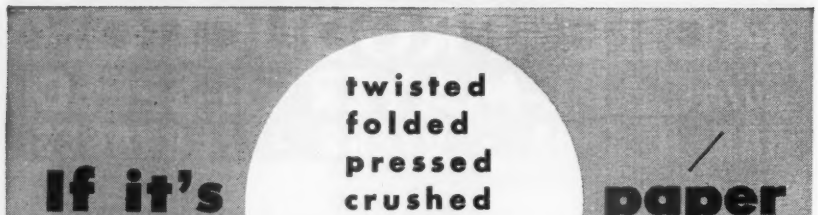

TWITCHELL makes it

fine, treated yarns wound 4 ends parallel for high-speed wrapping by new Abbo-sealed process will be available soon.

waxed cable-filler for 2- and 3-wire semi-metallic sheath cable and ship-board cable.

wire-rope cores

braiding and wrapping yarns for electrical cable.

E. W. TWITCHELL INC.
Third & Somerset Streets,
Philadelphia 33, Pa.

SCRAP SHORTAGE NEEDS... YOUR COOPERATION

A letter from W. Averell Harriman, Secretary of Commerce, to R. M. Hussey, President of the Wire Association, calls attention to the need of scrap to maintain maximum steel production.

While wire men connected with big steel are keenly conscious of the seriousness of the scrap shortage, a reminder to them, to all re-drawers of wire and to wire products fabricators to get their scrap back to the steel producers regularly and promptly, may not be amiss.

Our membership is therefore requested to look into this question immediately. Your concerted efforts to make available every pound of this critically needed material with the greatest possible despatch will help to keep the steel mills running — which in turn, helps you.

Even those who have small accumulations, who may not think their bit is needed, may be assured that if all do their share, the aggregate benefits will be large.

THE WIRE ASSOCIATION

Richard E. Brown, Executive Secretary

300 MAIN STREET STAMFORD, CONN.

hibitors. However, since they have the additional property of wetting or lowering surface tension and the ability to cause the pickled steel to develop a bright, smut-free surface, they are designated as "steel surface conditioners."

1. **They save steel in that only the scale is attacked to any great extent.**
2. **They save acid because the acid ordinarily used in attacking the steel is not consumed.**

Additional advantages are:

1. **Reduction of hydrogen embrittlement, which occurs as the result of the hydrogen freed by the action of the acid on steel being absorbed by the steel during the pickling operation.**
2. **Decreased hazard because much less spray is produced, inasmuch as the amount of hydrogen formed is small.**

* * *

FULL instructions for use are obtainable on request from the **Hanson-Van Winkle-Munning Co.**

* * *

Steel-Making Progress in 1947 announced by U. S. Steel Corporation

INAUGURATION of an expansion and improvement program to cost in the neighborhood of $500,000,000 was the biggest steel-making news launched by **United States Steel Corporation** in 1947. Virtually all the Corporation's far-flung operating subsidiaries will share in the program.

* * *

TECHNOLOGICAL developments by Corporation scientists and technicians ranged from better blast furnace and open hearth practices, heating, rolling and heat treatment to new products and the measurement of new properties for the benefit of steel buyers.

* * *

AT a technical meeting during 1947, the first detailed report on the stretch-reducing rolling process for the production of seamless pipe in small diameters was presented. This special technique is the nucleus of a large, new seamless pipe mill now under construcion by a United States Steel Corporation subsidiary.

* * *

Heat Treatment of Steel

WHILE no basically new discoveries were made in the field of heat treatment, increased attention has been given to the application of existing knowledge to improving methods of specification for heat-treatable steels, using the hardenability concept as a basis for the new classification. The importance of hardenability has been recognized in establishing limits in the form of hardenability bands (so-called H bands) which in heat treating problems are coming to be recognized as being more important than a rigid adherence to narrow chemical specifications.

* * *

New Products

A series of new deep hardening carburizing steels was announced during 1947 by one of the subsidiaries of United States Steel Corporation. The steels have good carburizing, annealing and machining properties, and were designed to meet the need for easily fabricated airplane, truck and bus gears, shafts and pinions subject to heavy duty service. The steels make more effective use of alloying elements and are therefore more economical than higher alloy grades. The new steels are similar to 3300 or 9300 steels in one grade, while the second and third grades are similar, respectively, to 4800 and 4300 steels.

* * *

ELECTROLYTIC tinning units and the complex mechanisms for their operation were the subject of continuing research during 1947, and numerous advances in mechanical and electrical control devices as well as conveying equipment were made, not to mention chemical engineering advances of considerable scope. This has resulted in tin plate of improved quality, uniformity and wider application.

* * *

THE year 1947 saw continuing research carried out on the mechanical properties of steels, their response to heat treatment, the problems of flow and fracture conditions and especially to behavior under multiaxial stresses. Correlation between notch-impact proper-

JOHNSON WIRE • JOHNSON WIRE
JOHNSON Nation-Wide Streamline Service on High Quality Specialty Steel Wires. Laboratory supervision from mine to finished product . . . Unfailing supply of premium steel . . . controlled grain structure . . . of restricted analysis. Warehouse stocks—Worcester, Chicago, Los Angeles.
JOHNSON
STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto

WILLEY'S SIZING EXTRUSION and WIRE DRAWING DIES

They are made from a specially developed grade of Tungsten Carbide having those characteristics needed for dies—freedom from porosity, great abrasion resistance and the ability to take a polish equal to that of diamonds.

FOUR CLASSIFICATIONS OF WILLEY'S DIES

A. Blank and rough cored nibs.
B. Rough cored dies (cased).
C. Semi-finished, rough drilled dies (cased).
D. Finished dies, ready for use.

Sales Engineers in Principal Cities.

Standard Sizes from .325 to 4.000. Special Sizes and Shapes Made to Order.

WRITE FOR NEW CATALOG 30
Gives full information on Willey's Dies in addition to other standard tools.

Visit us at Booth 118, Cleveland, March 15-19.

WILLEY'S CARBIDE TOOL CO.
SOLE MAKERS OF WILLEY'S METAL
1342 W. Vernor Highway Detroit 1, Michigan

ROOS
WIRE DIE FINISHING MACHINERY

A COMPLETE LINE OF WIRE DIE FINISHING MACHINERY FOR THE

DIE ROOM

- ROOS LIGHT DUTY LAPPING MACHINERY
- ROOS HEAVY DUTY LAPPING MACHINERY
- ROOS SEMI-AUTOMATIC POLISHERS
- ROOS AUTOMATIC POLISHERS
- PARK PIN GRINDERS
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- ROOS PRECISION PIN GRINDER
- ROOS — 10 SPINDLE DRILLER
- ROOS NEEDLE GRINDER
- ROOS BALL BEARING POLISHING HEAD
- ROOS POLISHING LATHE
- SPECIAL MACHINERY FOR SQUARE OR SHAPED DIES

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ROOS TOOL Mfg. Co.

ENGINEERS - DESIGNERS of TUNGSTEN CARBIDE FINISHING MACHINERY

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Plant and Eng. Dept. 17-19 Grove St.
MONTCLAIR, N. J.
NEWARK SUBURB

ties of welded steels under severe service conditions involving notches, severe constraints, low temperatures, sudden leading, and so on has been improved, and further attention given to the mechanism of the impact test and resistance to crack propagation.

* * *

AMONG the new instruments recently developed by technicians of the United States Steel Corporation was a microhardness tester announced during 1947. This instrument is capable of accurately measuring the hardness of very minute areas of a polished steel surface, and has been used to determine the comparative hardnesses of different microstructural constituents of steel samples by actually measuring the hardness of individual grains.

* * *

ANOTHER device developed was a water-cooled pyrometer operating on the radiation principle that has found successful application in the measurement of surfaces at elevated temperatures. The device is portable and can be used for measuring surface temperatures of slabs in reheating furnaces, and so on.

* * *

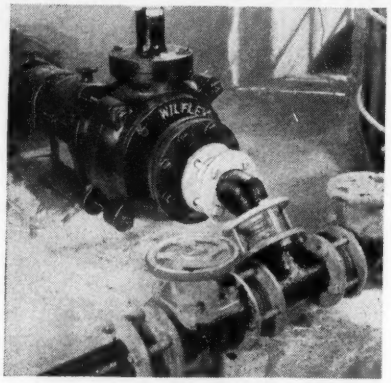
HIGH speed photographic techniques have been applied to the study of many pertinent phenomena involved in the production and processing of iron and steel. Modern equipment has been added to laboratory facilities to further this work.

* * *

New General Tool Catalog Available from Carboloy Co.

AN outstanding feature of the catalog is the 12-page section devoted to wear resistance applications. In these pages are pictured approximately 100 typical examples of the way in which users in the food, ceramics, textile, watchmaking, wire making, metal working, etc., industries have applied Carboloy cemented carbide to their machines and products to increase service life and reduce operating costs. In this section, too, the new method of attaching large sections of carbide with studs, bolts, etc., is pictorially described.

AVOID COSTLY SHUTDOWNS DUE TO *CORROSION*...



SPECIFY

HAVEG

EQUIPMENT FOR

CORROSION RESISTANCE THAT'S MORE THAN SKIN DEEP

- Agitators
- Baskets
- Blowers
- Fume Duct
- Filters
- Kettles
- Piping
- Pumps
- Tanks
- Towers
- Many Others

HAVEG is a molded structural material that is completely acid and alkali resistant throughout its entire mass . . . it is not a lining nor a coating!

Large size equipment can be molded at low cost in one piece without seams or joints and installation accomplished easily and economically.

Send for Bulletin F-5 for complete design, engineering and application data.

HA-6-47

HAVEG CORPORATION
NEWARK 47, DELAWARE

CLEVELAND 14 · CHICAGO 11 · HOUSTON 6 · DETROIT 11 · LOS ANGELES 13

Labor Relations

(*Continued from page* 146)

ALL of this has concrete significance for wire manufacturers in the near future. For if wage negotiations now going on break down, the resulting strikes may precipitate the very actions discussed above. Production figures would suffer a tremendous blow and labor relations placed in a state of unbalance for months, possibly years, to come.

* * *

Opens Building in New York

THE Owens-Corning Fiberglas Corporation, Toledo, Ohio, opened their new building at 16 East 56th Street, New York City, on January 6th with a housewarming party to the press.

* * *

THE building is an unusual structure, for in addition to housing the company's New York staff, it symbolizes the growth of a depression-born industry, and serves as a permanent demonstration of the wide range and numerous applications of glass in fiber form. It betokens the extensive and continuing research and development programs that have fostered the creative usefulness of glass fibers as basic materials.

* * *

MORE than a score of Fiberglas materials, ranging from air filters, thermal insulation batts, acoustical blankets and acoustical tiles, to glass yarns fabricated into curtains, wall coverings and upholstery fabrics, are used in the building, its equipment and its interior decoration. The architects, Skidmore, Owings and Merrill, were directed to use Fiberglas materials wherever practical, regardless of whether they had ever before been used for similar purposes in an office building, or whether they had ever before been used in any similar application.

* * *

BESIDES the practical applications of Fiberglas in its numerous forms in the construction and equipment of the new building, there are exhibits of other forms of Fiberglas products, as, for instance, in electric wire and cable, fishing poles and so forth.

* * *

Acid-Proof Brush

DEVELOPED for use by industrial users of acids for cleaning operations, this new acid-proof brush is made by **The Eraser Co., Inc.**, Syracuse 2, N. Y.

* * *

THE brush is made with a soft tuft of "FybRglass" solidly imbedded in a wood handle of conventional shape. When wet, the FybRglass becomes soft and pliable in the same manner as ordinary brushes. The brush may be used in any acid that does not affect glass—nitric acid, soldering fluxes, chromic acid, chlorde of iron, etc. Any manufacturer using acids for cleaning purposes may secure a brush on a trial basis.

* * *

Present Trends in Nickel Alloys

Digested from a Report by the Staff of The Development and Research Division of The International Nickel Company, Inc.

A heavy demand persisted this year for alloys of all types containing nickel to satisfy the needs of the metal industry in which high production has been the keynote. A number of trends were observable which reflected the increasingly exacting demands of industry for better performance from all kinds of equipment, tools and appliances.

* * *

THE American Iron and Steel Institute during the year established as one of its standard alloy steels, a free-machining variety of low alloy, triple alloy steel, known as 8641. It is especially well suited for automatic screw products and combines a high degree of machinability with the good properties of alloy steels.

* * *

Warner

BELL-MINE LIME

for

WIRE DRAWING

WARNER COMPANY
BELLEFONTE DIVISION
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EASTWOOD WIRE
CENTRIFUGALLY-CAST FOR QUALITY

Phosphor Bronze
Nickel Silver
WIRE
FLAT WIRE
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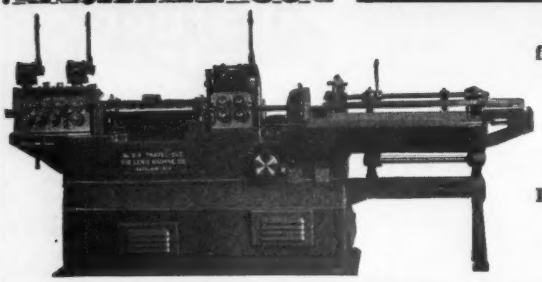
Eastwood-Nealley
CORPORATION
Belleville 9, New Jersey

LEWIS TRAVELCUT WIRE STRAIGHTENING and CUTTING Machines



Machines for 1/16" to 3/4" rod
Round
Square
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Ferrous and Non-Ferrous

Automatic
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Heavy Duty

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USE THE PROVEN BRAND . . .

Whatever wire product you make, Cortland Brand wire can help you make it better. For wire fabrication of all types, Cortland wire has the right softness or hardness, freedom from surface defects, and correct lubricating properties. There is a Cortland wire in a size and style to fit your requirements.

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WIRE MANUFACTURING MACHINES
For
DRAWING — ANNEALING — TINNING — ENAMELING
STRANDING — SPOOLING — COILING
Aluminum Reels And Spools
We Will Build Machines To Your Specifications
Write For Information
LARIBEE MACHINE Co. Inc. • CAMDEN, NEW YORK

Stainless Steels

THE high volume of production of stainless steels achieved during the war years has continued in the post-war period. Ingot production of over 500,000 tons was reached in each of the years 1945 and 1946. Based on the present outlook equally high volume, or more, is predicted for the year 1948.

* * *

INDUSTRY looks forward to further expansion in volume and scope of uses in the future, and is continuing its research and development activities to provide a better knowledge of fabricating procedures and a broader consumer appreciation of the economies offered by the stainless steels in terms of lowered costs of maintenance, repairs and replacements.

* * *

Nickel and High Nickel Alloys

THE varied and versatile properties of nickel and the high nickel alloys, such as Monel and Inconel, are influencing their uses for many purposes involved in current advances of the various branches of science, including chemistry, aeronautics, electronics and medicine.

* * *

SPECIAL electrical and other properties of nickel have developed markets in the rapidly expanding field of televison. Typical of this development are the nickel and nickel alloy elements used in the image orthicon, super-sensitive eye of the television camera, and in the cathode ray tubes and amplifier tubes used in the receiver.

* * *

IN the field of accessories, industries facing corrosion problems are turning to Monel fastenings—such as hollow, self-plugging rivets for blind working, and nails with annular grooves to give the holding power of screws.

* * *

Nickel Plating

NICKEL plated steel wire suitable for redrawing and fabricating has become available in lim-

WIRE CUTTING
MADE EASY

Hard wire*, spring wire, as well as soft wire, wire fabric, tie wire, fencing, etc. — easily and quickly cut with a porter tool. A standard model for average needs. Special models for special work.

Send for catalog showing all Porter models of wire cutters, bolt clippers, etc.

*(with center cut round edge jaws)

H. K. PORTER, INC.
74 FOLEY STREET
SOMERVILLE 43, MASS.

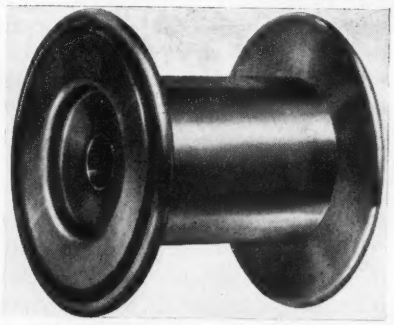
PORTER HKP CUTTERS

ited quantities. Electroformed screen has been employed in amounts comparable to the best pre-war years, and electrodeposited foil is progressing from development work to the commercial stage. Research by various technical societies and cooperating organizations is adding to the knowledge of such properties of nickel deposits as strength, corrosion-resistance and internal stresses, and of practical means of obtaining the most desirable properties.

* * *

New Light Metal Alloy Shipping and Limited Process Spool

MADE for the spooling of magnet wire and similar extremely fine wires, this new Hubbard Spool offers considerable advantage as a unit for shipping wire. Made of a strong light metal alloy, the spool offers a weight reduction of approximately 15% compared with



New Light Metal Alloy Spool by Hubbard

similar size spools of standard construction. Decreased weight of the spooled package means important savings in shipping costs to buyers of fine drawn wire. These new spools are precision made and balanced... and are built with sectional thicknesses sufficient for all operating strength requirements. By-product of light metal alloy construction is a brilliant appearance that provides genuine eye-appeal to the spooled wire package. Use of light metal alloy also eliminates rust problems. Complete information available from the manufacturer... **Hubbard Spool Company,** 1622 W. Carroll Ave., Chicago 12, Illinois.

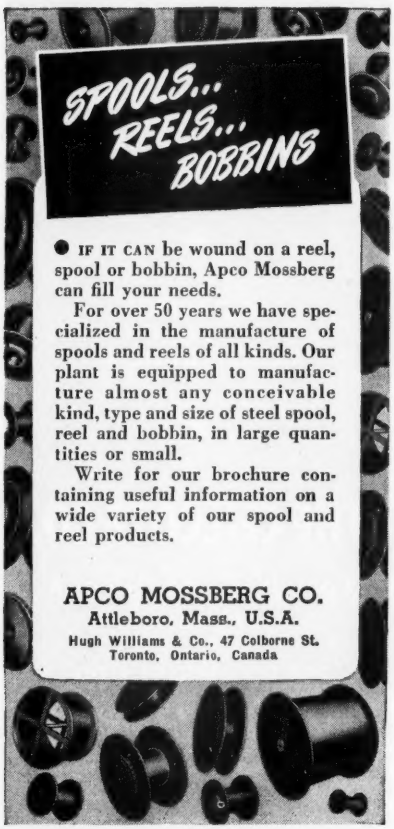
* * *

BORAX
for
Wire Drawing

After pickling, BORAX can be applied with one dip; dries in three minutes in an oven temperature of 150° F. to provide a coating that will not check or flake off in storage. Dissolves readily in water and is dust free. BORAX, other than being an excellent vehicle for picking up the drawing lubricant, is rust inhibiting and a natural flux that will facilitate the making of good butt welds. Use BORAX to make better wire at less cost. Used in many mills.

Send for complete particulars

PACIFIC COAST BORAX CO.
51 Madison Ave., New York 10, N.Y.



● IF IT CAN be wound on a reel, spool or bobbin, Apco Mossberg can fill your needs.

For over 50 years we have specialized in the manufacture of spools and reels of all kinds. Our plant is equipped to manufacture almost any conceivable kind, type and size of steel spool, reel and bobbin, in large quantities or small.

Write for our brochure containing useful information on a wide variety of our spool and reel products.

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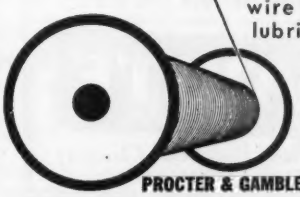

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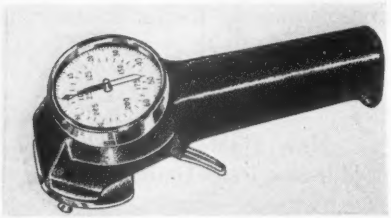

Tension Meter by Saxl Instrument Co. * * *

* * *

THIS new Tension Meter is valuable for all types of thread-like materials, whether they are copper wires to be covered with insulation, or insulated fine wires which are wound on small coils, for ammeters, telephones and transformers. In winding Tungsten wires such as are used in incandescent lamps and in the manufacture of helical grids of radio tubes, tension control assures dimensional stability.

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A brochure describing the many applications of the Saxl Tension Meter may be obtained without charge upon request from the Saxl Instrument Co., Harvard, Mass.

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New Bulletin on Annealing

ANNEALING in Surface Combustion Standard Rated Furnaces is described in a new 4 page Bulletin No. SC-135 just issued by **Surface Combustion Corporation,** Toledo 1, Ohio.

* * *

THE bulletin, appropriately illustrated, defines the various annealing and related processes for both ferrous and non-ferrous metals. A critical temperature range chart showing in color normalizing full annealing, spheroidizing and process annealing ranges and photo micrographs of annealed low, medium and high carbon steels are included.

* * *

THE bulletin describes and shows illustrations of both direct fired and prepared atmosphere furnaces, discussing the advantages of each type.

* * *

THE bulletin describes and shows the amount of gas saved by correct proportioning of the air-gas ratios for combustion.

* * *

New Bright Dipping Solution for Copper Announced

ROSSAUL Copper-Brite, a new, safe solution for bright dipping of copper and copper alloys has just been introduced by the **Rossaul Company** of New York City.

* * *

COPPER-BRITE removes oxides, leaves metal bright and shiny, resistant to future tarnish or discoloration. Metal is left passivated and ready for the next operation.

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THE traditional platers' bright dip, sulfuric and nitric, as users know from unpleasant experience, creates offensive fumes and is highly toxic. The outstanding advantage of Copper-Brite is that it is **non-toxic, non-fuming** and safe for the worker to handle!

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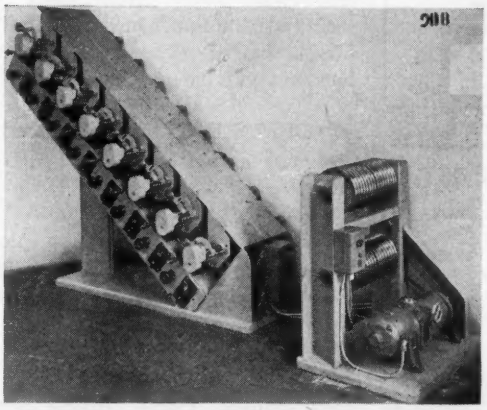

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New Bulletin Gives "Inside Story" of Corrosion-Resistant Y and Angle Valves

A new bulletin released by **The Duriron Co., Inc.** of Dayton, Ohio, describes Durco corrosion-resisting, Series 35 Y valves and Series 36 Angle valves and shows their internal construction by means of cutaway views.

* * *

THESE illustrations bring out construction details and show, in color, which parts of the valve are made of a special corrosion-defeating Durco alloy. Features are listed and a brief explanaton of the type of service for which the valves are best suited, is given. The bulletin provides complete dimension data on the various sizes and includes an illustrated parts list.

* * *

THE folder also tells how the valves can be equipped with air operated diaphragm motors for automatic regulation of the flow of corrosive solutions.

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A free copy of this new bulletin can be obtained by writing to The Duriron Co., Inc., Dayton, 1, Ohio, and requesting a copy of bulletin 615.

* * *

The Anonizing Process

IT is often desirable to protect aluminum surfaces without changing from the natural aluminum color. The nearest approaches to this type of protection have been by Anodizing or clear lacquering. Anodizing is relatively expensive and entails costly equipment, while clear lacquering is not very adherent, and has other drawbacks.

* * *

THE ANONIZING Process is a simple immersion method of protecting aluminum surfaces and yet maintaining its natural color. Aluminum that has been etched or mechanically or electrolytically or chemically polished as well as aluminum, as-furnished by the mill, can be treated by this process without noticeably changing the appearance.

* * *

THIS coating resembles an anodized coat (aluminum oxide) but it is more compact and it is quite protective, at the same time being transparent.

* * *

FOR detailed information, please write the Technical Process Division of Colonial Alloys Co., Philadelphia 29, Pa.

* * *

New Edition of Chemical Products Manual Available

PUBLICATION of a new edition of "Chemicals By Glyco", a 92-page manual listing and describing the many organic chemical compounds manufactured by the **Glyco Products Company, Inc.**, was announced recently by Harry Bennett, president. The chemical firm, which has plants in Brooklyn, N. Y. and Natrium, W. Va., manufactures an extensive line of chemical products for a wide variety of industrial uses. Besides listing and describing

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the complete line of Glyco chemicals, the new edition gives formulae for basic uses of the chemicals. Copies of the new manual may be obtained by writing to the company's main office at 26 Court Street, Brooklyn 2, N. Y.

* * *

AMONG the new products included are their **Glycolubes,** a series of new lubricants for use in metal working. The Glycolubes, available in a wide variety of forms for specifc uses, increase the speed of drawing, stamping and sheeting operations and prolong the life of dies beyond that achieved with older lubricants.

* * *

ALSO described in the new 92-page manual are many new uses for products which have been manufactured regularly for some time.

* * *

New Nitrogen Generator

GAS **Atmospheres, Inc.,** announces development of a new low-cost nitrogen generator known as the "Hi-Nitrogen Generator" for use in the metallurgical, processing and other industries. The self-contained Hi-Nitrogen Generator is a combustion method unit for producing nitrogen at a cost of a few cents per 1000 cubic feet of dry gas. The equipment operates on a mixture of air and natural gas or any manufactured gas such as butane, propane, water gas or coke oven gas. An illustrated brochure is available on request from Gas Atmospheres, Inc., 20011 West Lake Road, Cleveland 16, Ohio.

* * *

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Besides being profusely illustrated, there are many reference tables providing much useful data. An effort has been made to treat every phase of the subject in a practical and helpful manner. If you are making diamond dies or tools, or using them, you cannot afford to be without this book.

You may order it from this office. Just send check or order to:

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300 Main Street Stamford, Conn.

Grand Crossing Tack Co.
Interstate Iron & Steel Co.
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(Continued from page 150)

two feet deep, holding 43,000 gallons of solution, which is circulated by pumps in a direction counter to the travel of wire. Three separate units of take-ups are driven each with its adjustable speed motor so that several classifications can be plated at the same time and each at its proper speed. Speed is a paramount factor in this process. Current densities up to 700 amperes per square foot are used. A cold water rinse followed by a hot rinse for drying effect finish the job. Speed and current density determine the thickness of coating with great precision.

* * *

WITH regard to the general construction, two points are worthy of remark. One is the use of glass brick in the wall of the cleaning house, with admirable results. The other is the extensive use of control tunnels below the floor. This is a feature I myself stumbled onto at **Sheffield** ten years earlier. Like most good things it was quite accidental, in fact, a by-product. There was some leveling up of the ground required, and the cut didn't quite figure to equal the fill. Being penurious by nature, I decided to dig a tunnel under the wire mill floor rather than buy fill from outside. I spotted the tunnel just behind the line of wire machines, and little by little grew the conception of a control tunnel with short leads to each machine, with man-holes so placed that an electrician working on a panel could talk to the wiredrawer above, etc. It is a cleaner place for contacts than a gallery.

* * *

THE electrical details of this plant were planned and worked out with great care. Everyone who has inspected the mill will recall the control tunnels, the huge bus bars, the absence of floor obstructions chargeable to the current supply and, without expert knowledge of the subject, will reach the conclusion that somebody planned that job for the ages. There is much

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there to interest the electrical expert, but he will have to go there and see it; electricity is one of my blind spots, and I am not going to try to describe it. I will only remark that here for the first time in this part of the world direct current in large quantities is supplied through a mercury arc rectifier, with automatic voltage control by means of electrically energized grids. The nine inch copper channel one half inch thick which constitutes the bus from this panel is the largest ever rolled.

* * *

PLANS have been shaping up for a long time to withdraw from the old 79th St. location, and consolidate all wire operations at **South Chicago**, in fact by the time this article is published the shift will probably have been completed. The following new units will be involved: **Morgan-Connor** machines for the high carbon products, **Lee Wilson** annealers, **Surface-Combustion** patenting units, straightening and cutting machines by **Lewis**, additional fence machines, and a 40-wire hot galvanizing and 12-wire hot tinning unit. The increase is figured to cover the loss of the old **Grand Crossing** unit and an expansion of the farm products tonnage of the existing plant.

* * *

A Review of Recent Wire Patents

(*Continued from page* 163)

Bennett, Ridgewood, N. J., assignor to The Okonite-Callender Cable Company, Incorporated, Paterson, N. J., a corporation of New Jersey.

About the wire conductor is paper insulation, with a sealed impervious enclosure for the paper insulated conductor, and a fixed quantity of a solution of inflammable insulating oil and dichloro difluoromethane, the latter being partly in the liquid phase, impregnating the paper and filling all of the spaces within the enclosure, the proportion of the dichloro difluromethane to the oil being such that the solution is non-inflammable, the solution maintaining the cable under internal superatmospheric pressure through out the operating temperature range of the cable.

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WHERE TO BUY

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ABRASIVES—
Norton Co., Worcester, Mass.

ACID INHIBITORS—
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

ACID-PROOF CONSTRUCTION
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.

AIR DRAW FURNACES—
Carl-Mayer Corp., Cleveland, Ohio.

ALKALINE CLEANERS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.

ANNEALING MACHINES—Open Flame
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
Laribee Machine Co., Inc., Camden, N. Y.
National Annealing Box Co., Washington, Penna.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J.

ARMORING EQUIPMENT—
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machy, Inc., Pawtucket, R. I.

BAKERS—Rod and Wire
Carl-Mayer Corp., The, Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ross, J. O., Engr. Corp., New York, N. Y.

BAR STOCK—Stainless Steel
American Rolling Mill Co., The, Middletown, Ohio.

BENDERS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

BORAX—Wire Drawing
Pacific Coast Borax Corp., New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAKES—Pneumatic
Entwistle, Jas. L. Co., Pawtucket, R. I.

BRAKES & SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

CABLE LACQUERING OVENS—
Industrial Ovens, Inc., Cleveland, O.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N.J.

CEMENTS—Acid Proof
Ceilcote Co., The, Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

CHEMICALS—Stearates
American Cyanamid Co., Industrial Chemicals Div., New York, N. Y.

CLEANERS—Hand and Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila, Pa.
Magnus Chemical Co., Garwood, N. J.
Nopco Chemical Co., Harrison N. J.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANING & PICKLING EQUIP.—
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

CLOTH TESTERS—
Scott Testers, Inc., Providence, R. I.

CLOTH—WIRE, All Metals
Roebling's, John A. Sons, Co., Trenton, N. J.
Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., Buffalo, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co. Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COILERS—Sheet, Strip and Wire
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
Laribee Machine Co., Inc., Camden, N. Y.
Ruesch, H. J. Machine Co., Newark, N. J.
Wean Equipment Corp., Cleveland, Ohio.

COLD HEADERS—
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Diamond
Engis Equipment Co., Chicago, Ill.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Nopco Chemical Co., Harrison N. J.
Oakite Products, Inc., New York, N. Y.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison N. J.
Oakite Products, Inc., New York, N. Y.
Pacific Coast Borax Corp., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.
Swift & Company, Chicago, Ill.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Machinery Inc., Pawtucket, R I.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Vascoloy-Ramet Corp., North Chicago, Ill.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Everett, Mass.

DIAMONDS—Industrial
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Champion Diamond Co., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Champion Diamond Co., New York, N. Y.
Engis Equipment Co., Chicago, Ill.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Union Wire Die Corp., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND TOOLS—
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Cold Heading
Hoosier Carbide Die Co., Ft. Wayne, Ind.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
Hoosier Carbide Die Co., Ft. Wayne, Ind.

DIES—Lead Extrusion
Eastern Tungsten Carbide Co., Newark, N. J.
Wayne Wire Die Co., Hillside, N. J.
Robertson, John, Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Tungsten Carbide Co., Newark, N. J.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Tungsten Carbide Co., Newark, N. J.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Sintered Carbide
Hoosier Carbide Die Co., Ft. Wayne, Ind.

DIES—Special Shapes, Etc.
Hoosier Carbide Die Co., Ft. Wayne, Ind.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, Ohio.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.

DIES—Tubing
Hoosier Carbide Die Co., Ft. Wayne, Ind.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Hoosier Carbide Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, Ohio.
Rusch Wire Die Corp. Croton-on-the-Hudson, N.Y.
Tungsten Alloy Mfg. Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside. N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIRECT ELECTRIC RESISTANCE HEATING—
Trauwood Engr. Co., Cleveland, Ohio.

DRAW BENCHES—
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N.J.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRUMS—Flange Steel
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.

WHERE TO BUY, Continued

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro. Mass.

DRYING & PRE-HEATING ROOMS—
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.

DRYING EQUIPMENT—
Carl-Mayer Corp., The, Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N.Y.

ENGINEERS—Consulting Wire Mill
Lewis, Kenneth B., Worcester, Mass.

EQUIPMENT—Insulation Testing
Davis, R. L., Elec. Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I.

EYELETS—Brass or Zinc
Platt Bros., & Co., The, Waterbury, Conn.

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M. Co., Pittsburgh, Pa.

FRICTION PAY-OFF STANDS—
Industrial Ovens, Inc., Cleveland, Ohio.

FURNACES—Annealing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Hayes C. I., Providence, R. I.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engr. Co., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Automatic
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, Ohio.
Furnace Engineers Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Electric
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Hayes, C. I., Providence, R. I.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Hard'ing & Temp'ing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engr. Co., The, Cleveland, Ohio.

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Robertson. John, Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Normalizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Pot (Oil, Gas, Electric)
Ajax Electric Co., Inc., Philadelphia, Pa.

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corporation, Toledo, O.
Trauwood Engineering Co., The, Cleveland, Ohio

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corporation, Toledo, O.
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio.

GALVANIZING EQUIPMENT—
Hanson-Van Winkle-Munning Co., Matawan, N.J.

GAVANIZING FLUXES—
Hanson-Van Winkle-Munning Co., Matawan, N.J.

GALVANIZING KETTLES—
National Annealing Box Co., Washington, Penna.

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M. Co., Pittsburgh, Pa.

INSULATING LACQUERING SYSTEMS—Continuous
Industrial Ovens, Inc., Cleveland, Ohio.

INSULATING MATERIALS—
Crepe-Kraft Co., Newark, N. J.
Du Pont de Nemours, E. I., Co., Wilmington, Del.
General Electric Co., Schenectady, N. Y.
Owens Corning Fiberglas Corp., Toledo, O.
Standard Varnish Wks., Staten Island, N. Y.
Twitchell, E. W., Philadelphia, Pa.

KETTLES—Galvanizing, Annealing, Tinning, etc.
National Annealing Box Co., Washington, Penna.

LATHES—Die Reaming
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Morgan Construction Co., Worcester, Mass.
Roos, H. & G., Tool & Mfg. Co., Montclair, N.J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa.

LININGS—Acid and Alkali Proof
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.
Swift & Company, Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bale Tie
Reed & Richards Transatlantic Inc., New York, N.Y

MACHINERY—Braiding
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Brazing
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Bunching
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Laribee Machine Co., Inc., Camden, N. Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Chain Making
Nilson, A. H. Machine Co., The, Bridgeport, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Rope Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Entwistle, Jas. L. Co., Pawtucket, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Coilers
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Laribee Machine Co., Inc,. Camden, N. Y.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (used), New York, N. Y.
New England Butt Co., Providence, R. I.
Ruesch, H. J. Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.
Wire & Textile Machinery Inc., Pawtucket, R. I.

MACHINERY—Copper Wire Drawing and Rolling
Aetna Standard Eng'g Co., The, Youngstown, O.
American Insulating Mach'y Co., Phila., Pa.
Laribee Machine Co., Inc,. Camden, N. Y.
National Machinery Exchange (used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Mach'y Co., Phila., Pa.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cutting
Dore Manufacturing Co., Inc., Grayling, Mich.
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio.
Moslo Machinery Inc., Cleveland, Ohio.
National Mach'y Exch. (Used), New York, N.Y.
Nilson Machine Co., A. H., Bridgeport, Conn.
Porter, H. K. Inc., Everett, Mass.
Shuster, F. B. Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Die Making
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Roos, H. & G., Tool & Mfg. Co., Montclair, N.J.
Union Wire Die Corp., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Aetna Standard Eng'g Co., The, Youngstown, O.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Edging
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.
Laribee Machine Co., Inc., Camden, N. Y.
Syncro Machine Co., Perth Amboy, N. J.

WHERE TO BUY, Continued

MACHINERY—Extruding
National Erie Corp., Erie, Pa.
National Rubber Machinery Co., Akron, Ohio.
Robertson John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R. I

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Dore Manufacturing Co., Inc., Grayling, Mich.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Forming
Eisler Engineering Co., Newark, N. J.
National Mach'y Exch. (Used), New York, N.Y.
Nilson Machine Co., A. H., Bridgeport, Conn.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
Reed & Richards Transatlantic Inc., New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Galvanizing
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Pawtucket, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila., Pa.
National Erie Corp., Erie, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Material Handling
Cleveland Tramrail, Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MACHINERY—Measuring Wire & Cable
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Plating Electrolytic
Hanson-Van Winkle-Munning Co., Matawan, N.J.
Kenmore Metals Corp., New York, N. Y.

MACHINERY—Pointing
Aetna Standard Eng'g Co., The, Youngstown, O.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry & Mach. Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rubber Insulating
National Rubber Machinery Co., Akron, O.

MACHINERY—Rubber for Insulating Wire
National Rubber Machinery Co., Akron, O.
Royle, John & Sons, Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Rubber Tubing and Straining
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Screw Wire
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila., Pa.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Kenmore Metals Corp., New York, N. Y.
National Erie Corporation, Erie, Pa.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry & Mach. Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Spooling
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Laribee Machine Co., Inc., Camden, N. Y.
National Mach'y Exch. (Used), New York, N.Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Reed & Richards Transatlantic, Inc., New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Dore Manufacturing Co., Inc., Grayling, Mich.
Lewis Machine Co., The, Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
National Mach'y Exch. (Used), New York, N.Y.
Nilson, A. H. Machine Co., Bridgeport, Conn.
Ruesch, H. J., Machine Co., Newark, N. J.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Stranding
Hughesville Machine & Tool Co., Hughesville, Pa.
Laribee Machine Co., Inc., Camden, N. Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Ruesch, H. J., Machine Co., Newark, N. J.
Steel Equipment Co., Cleveland, Ohio
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Swaging
National Erie Corp., Erie, Pa.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Laribee Machine Co., Inc., Camden, N. Y.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Testing Physical
American Optical Co., Buffalo, N. Y.

MACHINERY—Testing Equipment—Sparkers
Davis, R. L. Elec. Co., Wallingford, Conn.
Entwistle, Jas. L., Pawtucket, R. I.
Scott Testers, Inc., Providence, R. I.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Laribee Machine Co., Inc., Camden, N. Y.
New England Butt Co., Providence, R. I.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila, Pa.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
National Erie Corp., Erie, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.

MACHINERY—Welding Wire
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery Co., Chicago, Ill.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila, Pa.
Eisler Engineering Co., Newark, N. J.
Laribee Machine Co., Inc., Camden, N. Y.
Moslo Machinery Co., Cleveland, Ohio.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wind-up (Constant Tension, Variable Speed)
Aetna Standard Eng'g Co., The, Youngstown, O.
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Wire Drawing
Aetna Standard Eng'g Co., The, Youngstown, O.
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
Laribee Machine Co., Inc., Camden, N. Y.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wood Screw
National Mach'y Exch. (Used), New York, N.Y.

MATERIAL HANDLING EQUIPMENT
Cleveland Tramrail, Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Eastwood-Nealley Corp., Belleville, N. J.
Hudson Wire Co., Ossining, N. Y.

OILS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Procter & Gamble, Cincinnati, Ohio.
Standard Industrial Compounds Co., Chicago, Ill.

WHERE TO BUY, Continued

OPTICAL EQUIPMENT—Metallurgical
American Optical Co., Buffalo, N. Y.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Dehydrogenizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Industrial
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAINTS—Marine
American Chemical Paint Co., Ambler, Pa.

PAINTS—Structural Steel
American Chemical Paint Co., Ambler, Pa.

PANS—Lead and Spelter
National Annealing Box Co., Washington, Penna.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Creped Wrapping
Crepe-Kraft Co., Newark, N. J.

PAPER—For Coil Wrapping and Corrosion Prevention
Crepe-Kraft Co., Newark, N. J.

PAPER TESTERS—
Scott Testers, Inc., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D.C.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

PICKLING EQUIPMENT—Acid Resisting
Gordon, Clark E., Detroit, Mich.

PICKLING—Hooks for—
Gordon, Clark E., Detroit, Mich.

PICKLING TANK LININGS—
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.

PIPES & FITTINGS—Acid Resistant
Ceilcote, Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.

PLASTIC TESTERS—
Scott Testers, Inc., Providence, R. I.

PLATING PROCESS—Electrolytic
Hanson-Van Winkle-Munning Co., Matawan, N.J.
Kenmore Metals Corp., New York, N. Y.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland Ohio.

POTS—Lead Melting
National Annealing Box Co., Washington, Pa.
Robertson, John, Co., Brooklyn, N. Y.

POWDER—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

PRESSURE VESSELS—
National Annealing Box Co., Washington, Penna.

PULLERS—Wire
Scudder, E. J., Fdry. & Mach. Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

REEL AND TENSION STAND—
Industrial Ovens, Inc., Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REEL STANDS—Pay Off & Take Up
Dore Manufacturing Co., Inc., Grayling, Mich.

REELS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Collapsible
Entwistle, Jas. L. Co., Pawtucket, R. I.

REELS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS AND SPOOLS—Shipping and Shop
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg., Co., The, Hazardville, Conn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Nelson Company, The, Baltimore, Md.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Takeoff
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., Hazardville, Conn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Nelson Company, The, Baltimore, Md.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Vulcanizing & Impregnating
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Wire Drawing
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Wire Mill
Durkee Mfg. Co., Pine River, Minn.

REELS—Wooden
Acrometal Products, Inc., Minneapolis, Minn.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Nelson Company, The, Baltimore, Ind.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N.Y.

RODS—Nickel Alloy
Eastwood-Nealley Corp., Belleville, N. J.
International Nickel Co., Inc., New York, N.Y.

RODS—Stainless Steel
American Rolling Mill Co., The, Middletown, O.

RODS—Wire—Non-Ferrous
Eastwood-Nealley Corp., Belleville, N. J.
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROLL STRAIGHTENERS
Moslo Machinery Co., Cleveland, Ohio.

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott Testers, Inc., Providence, R. I.

RUST PROOF COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.

RUST REMOVING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Heil Process Equipment Corp., Cleveland, Ohio.
Standard Industrial Compounds Co., Chicago, Ill.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machy, Inc. Pawtucket, R. I.

SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

SHEET—Steel
American Rolling Mill, Middletown, Ohio.
Continental Steel Corp., Kokomo, Ind.
Youngstown Sheet & Tube Co., Youngstown, O.

SOAPS—Industrial and Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison N. J.
Potter, Neil C., Newark, N. J.
Procter & Gamble, Cincinnati, Ohio.
Swift & Company, Chicago, Ill.

SOLVENT RESIN SYSTEMS—Experimental
Industrial Ovens, Inc., Cleveland, Ohio.

SPOOLS—Annealing and Wire Drawing
Acrometals Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPOOLS—Shipping and Shop
Acrometals Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark Mfg. Co., J. L., Rockford, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp.,

SPOOLS—Steel
Acrometals Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark Mfg. Co., J. L., Rockford, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPRINGS—Tools for Forming
State Machine Tool Co., Hartford, Conn.

STAMPINGS—Steel
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass and Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

STRIP—Steel
American Rolling Mill Co., The, Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

WHERE TO BUY, Continued

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., Paterson, N. J.

TANK LININGS—Brick
Ceilcote Co., The, Cleveland, Ohio.

TANK—Compound
Haveg Corp., Newark, Del.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.
National Annealing Box Co., Washington, Penna.

TINSEL—Cords, Decorative
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TINSEL—Electric Conductor
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TINSEL—Electric Resistance
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TINSEL—Lame, Silver and False Gold
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TINSEL—Thread, Silver and False Gold
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TINSEL—Thread, Decorative
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TOOLS—Spring Forming
State Machine Tool Co., Hartford, Conn.

TOOLS—Wire Cutting
Porter, H. K., Inc., Everett, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRAVERSES—For Reels
Entwistle, James L. Co., Pawtucket, R. I.
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machy, Inc. Pawtucket. R. I.

TREADS—Safety
Norton Co., Worcester, Mass

TUBE BENDERS AND FORMERS—
Ruesch, H. J. Machine Co., Newark, N. J.

VALVES AND FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—For Insulation
Standard Varnish Wks., Staten Island, N. Y.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.

WIND-UP AND UNWIND SYSTEMS—Continuous
American Insulating Mach'y. Co., Phila., Pa.
Davis, R. L. Electric Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I.
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machy, Inc. Pawtucket, R. I.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh, Pa.
Malin & Co., Cleveland, Ohio.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Cleveland-Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.
Malin & Co., Cleveland, Ohio.

WIRE—Enameled for Coils
North American Philips Co., Inc., New York, N.Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Cleveland-Chicago & New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., of Colorado Fuel & Iron Corp., Buffalo, N.Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Nickel & Nickel Alloy
Eastwood-Nealley Corp., Belleville, N. J.
International Nickel Co., Inc., New York, N. Y.

WIRE—Music
Ecca Machine Corp., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio.
Paramount Wire Co., 100 Bleecker St., New York, N. Y.

WIRE—Nickel Silver and Phosphor Bronze
Eastwood-Nealley Corp., Belleville, N. J.
Hudson Wire Co., Ossining, N. Y.
Malin & Co., Cleveland, Ohio.

WIRE—Non-Ferrous to Specification for Special Purposes
Anchor Wire Corp., Jamaica, N. Y.
Eastwood-Nealley Corp., Belleville, N. J.
Hudson Wire Co., Ossining, N. Y.
North American Philips Co., Inc., New York, N.Y.
Paramount Wire Co., 100 Bleecker St., New York, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRESERVING—Paper and Cotton
Paramount Wire Co., 100 Bleecker St., New York, N. Y.

WIRE—Spring
American Rolling Mill Co., The, Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Cleveland-Chicago-New York.
Columbia Steel Co., San Francisco, Calif.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Paramount Wire Co., 100 Bleecker St., New York, N. Y.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH—Industrial
Roebling's John A., Sons Co., Trenton, N. J.

WIRE TESTERS—
Scott Testers, Inc., Providence, R. I.

WIRE, WEAVING—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

WRAPPING PAPER—Creped
Crepe-Kraft Co., Newark, N. J.

YARNS & TAPES—
Du Pont de Nemours, E. I., Co., Wilmington, Del.
General Electric Co., Schenectady, N. Y.
Owens Corning Fiberglas Corp., Toledo, Ohio.
Twitchell, E. W., Philadelphia, Pa.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

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February, 1948

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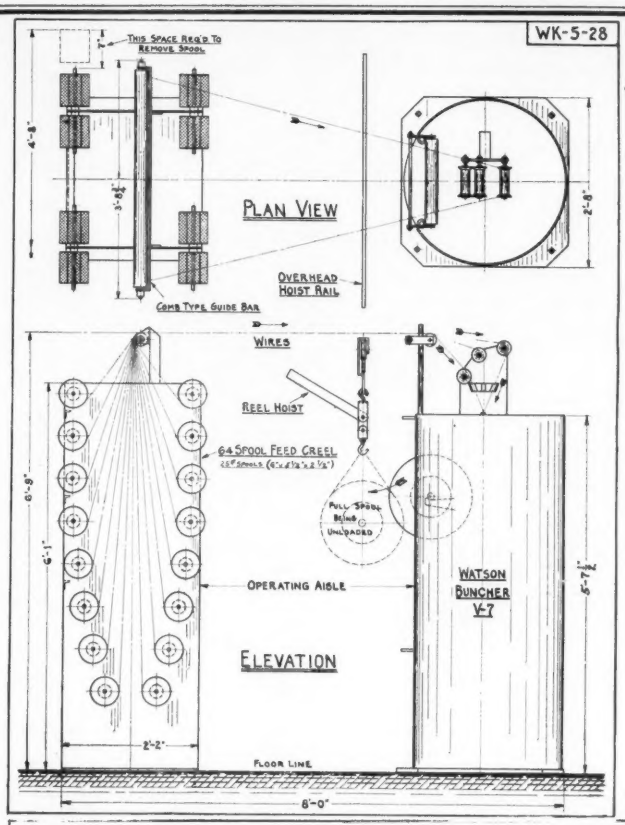

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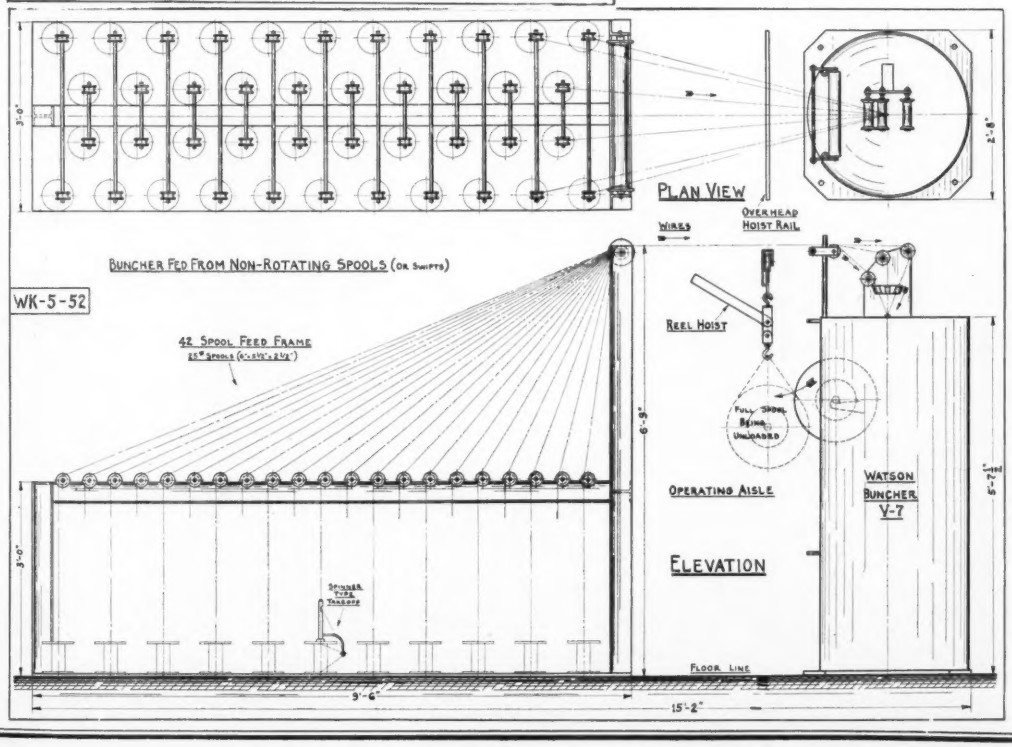

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